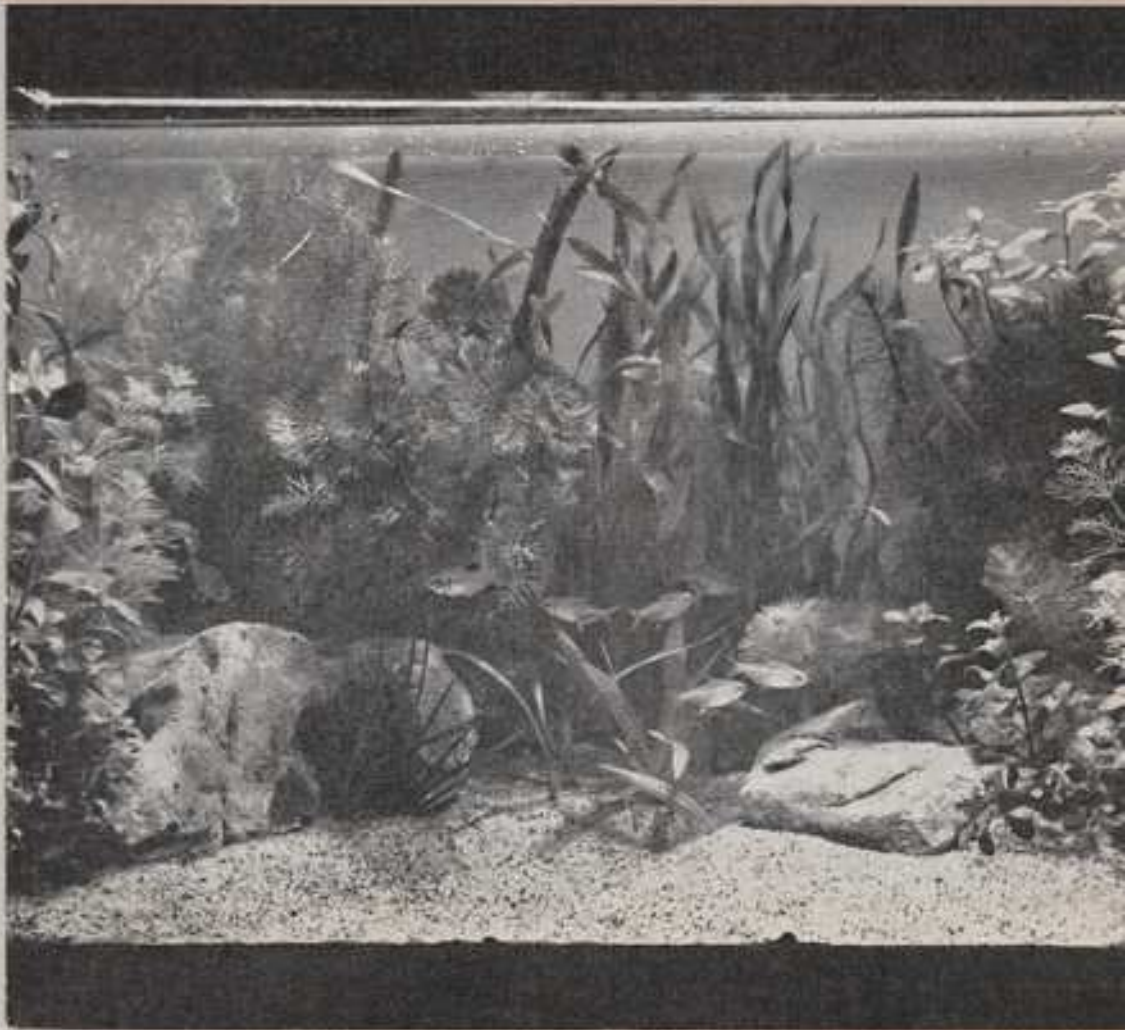


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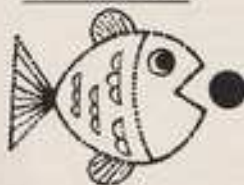
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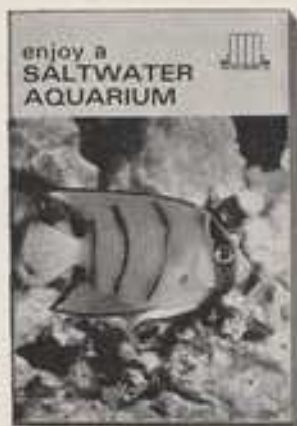
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Something on peat

by B. Fry

PEAT is formed from the decomposed or partly decomposed vegetation indigenous to swamps and bogs. The kinds of plants that grow in these places, or rather the predominance of certain species over others, determines the nature (chemical and otherwise) of the peat obtained from them.

As a rule, peat derived from sphagnum moss is more acid (about pH 4.0) than peat derived from the various water grasses or sedges. Nevertheless, sedge peat dug from several feet down is more acid than moss peat obtained from near the surface. This is because the acidity of all peats increases as they become more and more compressed under the weight of the annual spent green wastes.

Unless the aquarist knows something about horticultural methods, it is easy to make mistakes with peat. For example, the knowledgeable gardener always gives peat a thorough soaking before use. If he neglected to do this before heaping it around the roots of newly purchased trees or shrubs in dry weather the result would be calamitous; for the dry peat would tend to absorb whatever moisture was present in the roots of the plants and, at the same time, throw off any water descending through the soil from above.

Therefore just as peat should be made moist before using it in a garden, so it should be made moist before using it in the aquarium; for soaked or waterlogged peat will not rise off the floor of a tank (dry peat being extremely buoyant) unless it is churned up by some bottom-stirring fish. And even then it will not float in the water for more than a few seconds, provided the offending fish leaves the planting medium alone.

As far as we know, peat contains little or nothing in the way of food for plants. Its value lies in its spongy texture which, when mixed with some coarse sand or fine grit, allows the water to circulate freely and pass oxygen around plant roots with beneficial effects. Also, for those plants (and fishes) which flourish best in an acid and low-count bacteria environment, peat (always choose the non-fibrous sort on its way to becoming humus rather than the fibrous sort which is still in the process of decay and sometimes leads to troublesome fermentation when introduced into an aquarium) in neutral to soft water does nothing but good.

purple-headed or nigger barb (*B. nigrofasciata*) is not a compulsive fin-nipper and is always on the go. It makes a colourful occupant of a community tank. Less richly appalled and not so vivacious as the nigger barb is the checker barb (*B. algalops*). This is a dainty little fish, with black markings on the gold sides. The markings are so arranged that they give the impression of a draught—or checker-board. Two more praiseworthy barbs are Cumming's barb (*B. cummingsi*), gold, with large scales that reflect metallic lights, and the cherry barb (*B. nitens*) with a crimson body, paler coloured above than below, and a dark horizontal stripe bordered along the upper margin with yellow.

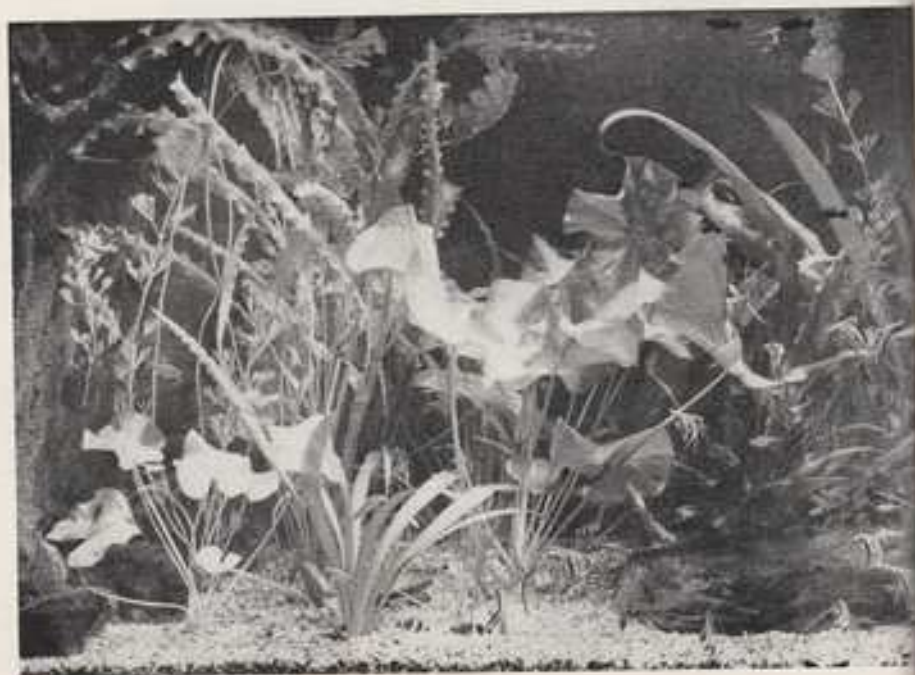
Closely related to the barbs are the cyprinids commonly known as "sharks" (*Labeo*). Although the "sharks" are essentially fishes of the bottom they do make frequent visits to the surface. The species with silvery green bodies and red fins are a better buy than the black-bodied red-tailed species (*L. bicolor*). This species will quarrel with its own kind, and if two are introduced into a tank one usually bullies the other to death. But a solitary red-tailed black shark rarely harms other fishes, and if it takes to its surroundings and eats well, or rather gets sufficient to eat, it will make a most handsome and lasting fish. The all-black "shark" (*Morus chrysoplekadion*) is worth its weight in gold. It eats anything, it lives for years, it minds its own business, and though it sometimes grows to a really large size, it does not attempt to molest smaller

fishes. When young (small) it is—or should be—a lovely velvety black, but as it increases in size it loses a lot of its rich black pigment and becomes greyish on the underparts and bronzy on the sides. But it is, all the same, a lovable and spectacular-looking species.

A lot of the easily obtainable catfish bounce or shuffle clumsily over the sand and, in so doing, raise the fine sediment. But as they punctuate their shufflings or bouncings with frequent periods of rest, and are interestingly shaped and coloured, the smaller ones (such as species of *Corydoras*) are worth introducing into a community tank. But because of their grubbing activities, two are sufficient in a tank no larger than 24 in. by 12 in. by 12 in. Be on your guard, however, against some of the larger-growing, torpedo-shaped catfish. All of them have hearty appetites, and as they do a lot of cruising around after dark, it is not unusual for them to gulp down any small fishes too lethargic to move out of their way.

The smaller characins (tetras) are esteemed for their good looks and pretty shoaling habits. It is a good plan to include several shoaling tetras of one species in a tank, together with a few other different species such as guppies, barbs and platys to add variety, rather than stock a tank with a plethora of single pairs, each of a different species. For a 36 in. by 15 in. by 15 in. tank not equipped with artificial aeration or filtration (for the benefit of the beginner,

Continued opposite



Do you want something different?

By Bill Simms



Spotted piranha—*Serrasalmo rhombus*

IN the large characin group is a section that has attracted the attention of travelers for a long time—even more than it has interested aquarists. But recently some of these fishes have been on sale in this country and a few aquarists have acquired some—with very mixed feelings.

These, of course, are the fishes usually grouped under the name of Piranha, or Piraya, all of which are carnivorous in the fullest sense.

The species illustrated here is *Serrasalmo rhombus*, the Spotted Piranha, one of those that can look attractive in an aquarium. However, it can reach a length of 14 inches in the wild and quite a small aquarium specimen, if fed on plenty of raw meat, could grow to six or more inches. Consequently biting the hand that fed it would not, then, be very difficult.

This habit of piranhas of taking lumps out of any living thing that moves in the water has been somewhat exaggerated. But even so, there is some foundation for the stories that have come out of South America—its natural haunt.

It seems that a man without a scratch on him can swim safely in piranha infested waters. But if there is any trace of blood on him the fish will attack at once, and if the shoal is a large one, not a scrap of flesh will be left on his bones within a few minutes.

This same ferocious attacking instinct is shown in large aquariums where a healthy shoal of these fishes may be kept. Provided that the shoal is kept well fed, and none act differently to the others, they will all be perfectly safe.

But if some new fishes are introduced—whether of the same species or not—the temporary lack of knowledge of their surroundings will show up as a difference of movement, and they will be attacked and eaten at once.

Not only this, but any member of the original shoal that is marked by the defence of its victim will also be eaten, the whole thing happening so fast that onlookers might find it hard to describe exactly what happened.

A slightly smaller piranha is *S. spilopleura*, which is like the spotted variety but has darker fins and is without the body spots. It reaches a length of only 8-10 inches in the wild, but is just as dangerous as the larger fish.

The *Pygocentrus piraya*, which grows to about 12 inches, has a bluish-green base colour, instead of the silvery brown of the two previous species. It is dotted over its body with various sized spots, and can look quite attractive.

Closely related to all these three piranhas is *Rossettiella nattereri*, perhaps the best known of all piranhas. It grows to 12 or more inches, and has vivid red lower parts. On its back and sides it is slaty-grey, becoming almost black on the back, but shining with a silvery light. All over it there are shining metallic spots, so that for sheer effect in an aquarium, this one is obviously the right choice.

If you decide to keep a few choose small specimens if possible, and place them in a well-furnished aquarium, but one that is well filtered. Coming from the tributaries of the Amazon the temperature required will be in the range of that given to the more usual "trops".

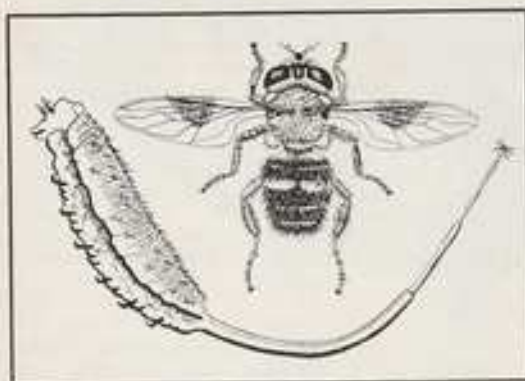
Food at first should consist of small live fishes and later the piranhas can be weaned onto raw meat, liver, fish, or any kind of raw flesh. This is the reason that the filtering must be most efficient. All debris must be quickly cleared. Be careful not to offer this meat with your fingers, however. A half to full grown piranha usually takes bites that are just the size of a finger end.

continued from page 202

Community aquarium

Let me say that the water in a well-tended tank not overstocked with fishes should stay in good condition for a number of years without changing; ten neon or cardinal tetras, whose splendid colours help to enhance the appearance of less richly garbed companions, would be all that is needed to keep it captivatingly bright and a delight to the most discerning eye.

But what about the number of small fishes (1 to 2½ in.) that may be kept in a balanced 36 in. by 15 in. by 15 in. tank you may ask. The answer is: limit your purchases to about 22 fishes—perhaps 26 if you include a pair or two of inoffensive, air-breathing gouramis (the dwarf, the honey, and the leeri are among the really well-behaved). With this number of fishes, properly fed and cared for, you can hardly go wrong.



The Junior Aquarist

Rat-tailed maggot and adult *Eristalis tenax*

Rat-tailed maggot

by Bill Simms

ALTHOUGH it might be thought that hover-flies could hardly be of concern to an aquarist, for they are normally just slender, bee-like insects seen hanging around flowers in the garden, there is one kind that can occasionally appear to have some connection with cold water aquariums.

This is the rat-tailed maggot, *Eristalis tenax*, which can reach a body and tail length of over four inches. The body rarely exceeds an inch and is usually about 1/2 an inch in length. The tail, though, is extensible (by blood pressure) and is shortened or lengthened according to the depth of water. It lives in the mud of dirty ponds and slow-moving streams. Often, when wild plants are collected for an aquarium, one of these creatures may come in with the plants and cause quite a shock as it grows.

Normally, this larva creeps along the bottom but in shallow water, which it favours, it sometimes buries itself and leaves the tail sticking up to the surface to suck in air. The sight of this peculiar "growth" in an aquarium can be startling especially when it retracts and starts to move along.

The adult *E. tenax* looks very much like a bee and has transparent wings. It is a shiny metallic-tinted black, somewhat hairy, and with patches of yellow on the side of its abdomen. It is completely harmless.

Eggs are laid in autumn usually along the banks of very slow streams or ponds but sometimes in decomposing material. They are white, of a longish oval shape, and appear to be a little large for such a small fly.

The larvae, when they hatch, show a preference for foul water, particularly if stagnant, and can live for a long time

without needing to breathe through their extensible tails or breathing tubes.

Throughout the winter they remain in their larval state, absorbing nutriment from small balls of mud which are collected and separated from the water by a mechanism in the throat. They progress by moving the foot-like pads under the body, and also by some body movements.

When ready to pupate the thin white skin of the larva begins to toughen and the larva creeps ashore. There a period of about two weeks in the toughened state takes the place of the usual transformation to a pupa, and it is from this that the adult fly emerges. One of these larvae seen in an aquarium is no cause for alarm—it is harmless to fishes—but it does indicate that the conditions at the bottom are becoming too rich in decaying material. I would consider it a sign that a clean-out was needed.

Fighting fish

by M. J. Parry

THE society of which I am show secretary (Newport A.S.) has a junior section, a recent canvass of which, indicated that one of their most popular tropical fish was the Siamese fighting fish (*Betta splendens*). Upon my introduction to the aquatic hobby I must admit that I had similar views, though my great regret at that time was what I believed to be the outrageously high prices demanded for a species which, all in all, is a quite simple member of the *Anabantidae* genus to breed.

The fighting fish is available in several "pure" colour varieties including black, cornflower blue, green and red. It is unfortunate that all too often nowadays we come across

"hybrid fighters" in which, by cross-breeding and a mixing of the various "pure" strains, nearly every colour of the rainbow is reflected in the body coloration. Although some of the most beautiful fighters I have seen can be grouped under this latter classification, they are frowned upon by one of the governing bodies of the organized aquatic hobby in Great Britain—the Federation of British Aquatic Societies, who state that for exhibition purposes the fighting fish should be self-coloured, that is to say that the whole of the fish, body and finnage, should be of the same colour, the only permitted exception being the Cambodia Fighter, with cream body and blood-red finnage.

The golden rule to remember when keeping fighters, of course, is that no two males should be maintained in the same aquarium. In its native country (Thailand) contests are frequently held between male fighters, which, when placed together in the same tank, will fight each other almost to the death. It is in this way similar to the cock-fighting of ancient England, with large wagers being placed on the result. The following extract from the book "1,001 questions answered about your aquarium," by I. M. Mellen and R. J. Lanier (published 1936 by George G. Harrap & Co. Ltd., London) gives, to my mind, an excellent description of the fighting techniques employed by the species: "The males of the species are more pugnacious than dogs or cats and with their little bodies flashing imitations of almost every notable gem, their handsome fins spread proudly like a turkey's tail and their gill covers expanded, they assail their rivals with fierce mien and damaging if not fatal consequences."

B. splendens is naturally carnivorous in diet, tubifex, daphnia, white worm, scraped beef, etc., filling the bill admirably. With a little patience, however, the species can be trained to take dried food, especially that containing a fair percentage of animal extract. With regard to water conditions it is neither fussy nor choosy, though seems to have a preference for water of an acid to neutral nature, pH 6.8-7.00. Its natural habitat consists of muddy, weedy waters with low oxygen content, and whilst we have no particular desire to provide water of a similar clarity (or rather lack of it) we should certainly endeavour to provide a great deal of aquatic vegetation in an effort to match its original environmental conditions.

For breeding purposes the Siamese fighting fish, as stated previously, is, all in all, a quite simple member of the *Anabantidae* genus to breed. It should be remembered from the outset, however, the unique characteristic of the genus is that it possesses an auxiliary breathing organ known as the "labyrinth," situated within the gill cavity, in which air can be stored thereby allowing them to utilise atmospheric oxygen in addition to that absorbed through the gills. The problems to be encountered during the development of the organ will be discussed in due course.

The breeding tank, preferably no smaller than the standard 24 x 12 x 12 in., should be set up to include acid or neutral water, pH 6.8-7.00. No aquatic vegetation is necessary, though a few cuttings of some suitable plant (*Hydrophyllum*, *Judicaria*, *Cabomba*, *Hygrophilla* for example) should be allowed to float in one of the back corners, around which the eventual "bubble nest" will be woven. For some time beforehand the fish should have been

separated and conditioned on the foods previously mentioned for fish of a carnivorous nature, and by this time, both fish should be "raring to go."

It has been the practice of almost every writer in almost every article on the breeding of tropical fish to recommend to the prospective breeder that the potential breeding pair should be introduced into the breeding tank late in the evening in order that they may spawn around dawn of the following day. With the fighting fish such advice is not necessary as far from spawning around dawn they are, indeed, more likely to spawn during the mid-afternoon or early evening. This is certainly my experience.

Commencement of the intention of spawning is denoted by the male "dancing" around the female, the fins and gill plates extended. Eventually he commences the building of a "bubble nest" by rising to the surface, gulping in air, and then releasing through the mouth his saliva-coated bubbles which stick to form a compact "nest" somewhat irregular in pattern. Upon its completion the actual "love play" begins, the male vigorously driving the female around the aquarium until, when exhausted, both come to rest under the "nest." Here, in a quick action he turns the female completely upside down, wrapping himself around her in the typical *Anabantid* fashion, squeezing out the eggs, which commence to drop from her vent towards the aquarium bottom. Here, the parental instinct comes in, with the male gathering the falling eggs into his mouth and blowing them into the "bubble nest." Such action takes place many times until upon termination as many as 400 eggs will have been safely deposited into the "nest." At this stage it would be advisable to remove the female.

Hatching occurs within 48 hours, whereupon the tiny fry will leave the "nest" and commence free-swimming. Feeding should begin with the finest food available, infusoria (or a suitable substitute in tubed form) and, in time, progression should be made to finely sieved daphnia, micro worm, brine shrimp, shredded tubifex, shredded whiteworm, etc.

At around three weeks old the formation of the "labyrinth" begins, with resultant high losses of fry. Such mortality may be restricted to a minimum, however, if absolute care is taken to shield the tank from draughts, and to employ a tightly-fitting glass cover over the aquarium. Sexual maturity is reached within six months, when the males, at least, should find a readily available market.



our readers



write

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Facts, not Supposition, Required

WHENEVER an article is published on an interesting subject of aquatic life, why is it always spoilt by the author delving into the theory (Greek, meaning "we think") of evolution, with all its maybe's and perhaps's.

We are told by M. Lorant, August issue, article "The Blue Whale," that this animal, possessing wonderful complexities necessary for survival in its environment, once lived on land and acclimatised itself to aquatic life. That if the whale were not buoyed up by water, its great weight would crush its bones, collapse its lungs and it would die. Alas, no whales; they died before they could reach the sea.

The article tells us that the blue whale has its nostrils located on the top of its head, as do dolphins. Why? Because this peculiarity is necessary to their mode of life. Science discovered that the centres of breathing are arranged differently in dolphins and whales than in other mammals, which are surrounded by a mantle of air, so they breathe without being conscious of a task of respiration most of the time; but with the whale it is logical that an air breathing creature, living in water, must be conscious of where it is at each breath, or it would drown. What about sleep? Nostrils on top of its head enable it to sleep on the surface and still have access to air.

Scientists admit that what they don't know about whales is a great deal. How it is that whales are able to survive dives of hundreds of fathoms without developing the bends, or caisson disease, remains unknown. Human divers would be killed if surfacing rapidly from 200 ft. or so.

In an attempt to explain this feat it is admitted, "The plain truth is, however, that we really do not know (how whales survive deep dives) since it is obviously impossible to confine a living whale and experiment on it, and almost as difficult to dissect a dead one satisfactorily" (*The Sea Around Us*, Rachel Carson, p.41).

The article informs us that the blue whale lives on krill, because its throat is so small that it can swallow nothing larger than a small fish. Why develop a small throat so it could only eat krill? Remember, it had to develop baleen plates in order for it to eat this food.

A scientist explains: "The ancestors of all whales we know by fossil remains, were land mammals. They must have been predatory beasts if we are to judge by their powerful jaws and teeth" (*The Sea Around Us*, p.40). Another authority states: "No fossil remains of the land ancestor of the whale have been discovered as yet" (*Introduction to Historical Geology*, William Stokes, p.419-420). *The Sea Around Us*, Carson, continues: "Perhaps in their foragings about the deltas of great rivers around the edges of shallow seas, they (whales' supposed ancestors) discovered the abundance of fish and other marine life, and over the centuries formed the habit of following them farther and farther into the sea." Notice the perhaps, must have, let alone contradictory statements of authoritative source.

These people don't know, call anyone who questions them uninformed, contradict each other right and left. John Q. Public swallows it as fact (because they say so) hook, line, and whalebone. I know this is only one contradiction, but they are so numerous as to fill a year's subscription of this magazine. Neither time nor space permits more. Since the ancestors of whales had large teeth, powerful jaws, and didn't exist, and this theory (Greek, we think) bases its assumptions on necessity of survival, it is illegal to go through complicated adaptations, which threaten survival in order to survive. So evolution would have us believe.

Apart from the greasy secretion of its eyes, there are many other facilities, necessary for sight above and below water. No mention was made of these, nor of the whales sonar system (which is far superior to man's clumsy efforts) without which it could not find its way about in the blackness 1,000 fathoms or more down. Here again little fact is known, but what is, is truly wonderful. The poor would-be whale must have had a horrid life before these developed. I wonder how many were forced to a life of blindness, to say nothing of the "bends," before these special "adaptations" were acquired, or "developed."

Excuse me if I appear frivolous, but when one reads such eminent theologians as Huxley and Darwin and finds

that they along with others pass over, and state they intend to, that which blows gaping great holes in their pet ideologies, and give us contradictions, it is little wonder that anyone with thought would be sceptical.

Me! I think life is all the more wonderful the more I see of it, than those who place their faith in perhaps, maybe, general acceptances, and postulations of we think. Who's we, anyway?

Let's have more facts and less perhaps in the articles. The hobby will be better for it.

JOHN A. WHITE.

ED.—Mr. White has a point and a grievance. He wants facts and I suspect the scientists share this desire quite moderately.

Pen Friends Wanted

I am a keen reader of *The Aquarist* which I borrow from the British Council library in Colombo. I am very interested in tropical fish keeping. I would like to correspond with some of your readers who are, of course, interested in fish keeping, as a penfriend. I would be very grateful if you would publish my name in your "Our readers" column. I am a 17 years old boy. I would like someone of either sex between 15 to 19 years old.

I have many tropical fish and other pets such as, dogs, birds, parrots, etc. I would like to know more about fish keeping with someone in England. So please help me.

Yours faithfully,

MANDUR ABDULHUSAIN,
12, Kensington Gardens,
Colombo 4,
Ceylon.

Ozonizers

SINCE my recent return from Hawaii where I have been studying the aggressive behaviour of several marine fish, I have been subscribing to your magazine and have been very interested in your "Going Marine" series. In our tanks at the Hawaii Institute of Marine Zoology we have been using ozonizers as described by Mr. Ravensdale to good effect against the scourge of the marine aquarium—the disease known as Marine Ich or Oodinium. We either keep tanks free by giving them continual doses of 1 mg. of ozone per hour per 10 gallons or, in the case of heavily diseased fish, isolating them and dosing them at a rate of 15 to 20 mg. per hour per 10 gallons.

The ozone was added to the airstream running through the sub-sand filters and no ill-effects were noted in the fish, even in newly metamorphosed juveniles where irritation of the gill membranes would be readily visible.

I should like to point out that the fish pictured on page 165, centre bottom is actually *Abudefduf varidus* or the "Kupipi" as it is known locally in Hawaii, not *Abudefduf varidus* as you stated. This may be readily checked on reference to *The Handbook of Hawaiian Fishes* by Gosline and Brock, or Jordan and Evermann's treatise on the fishes of the Indo-Pacific Basin.

I hope to see future articles on marine fish in your magazine and would be very grateful if you could recommend any books or papers on the behaviour or identification

of British marine fishes, as I should like to continue my work on territoriality and aggression in fish using easily obtainable local species.

Yours sincerely,
ANNE RASA.

The Editor thanks this reader for her comments on our printer's error.

Fish Foods and Your Views

THE new generic name of the dwarf butterfly cichlid is now *Mirogophagus ramirezi* and not *Apistogramma ramirezi* as in my article in July's issue.

I am very interested in fish foods and would welcome letters on the following points:

1. What fish food do your fishes like?
2. Do certain fishes prefer any special type of dried or live food?
3. What is your opinion on certain foods? Greasy, too large or too small, etc.
4. What do you think of the praises of the manufacturer?
5. Always state food, and if possible the manufacturer, when answering the above questions.

I will reply to every letter sent. Please write.

H. COLAS,
"Tara",
319 Queen's Road,
Maidstone,
Kent,
England.

I think that now *The Aquarist* is much much better than it used to be, in quality and quantity alike.

Yours faithfully,
H. COLAS (age 15).

Gyrinocheilus aymonieri

IN the May edition of *The Aquarist*, a reader asked for information regarding this particular "loach's" feeding requirements; apparently this aquarist was experiencing difficulty in feeding dry and live food to his particular specimens.

The answer to this reader's query, is as follows: "this loach lives on algae only."

From time to time other contributors to *The Aquarist* have expressed the same views.

I do not particularly wish to vie with these gentlemen's experiences regarding the feeding habits of the *aymonieri*; I only wish to inform your readers regarding my own experience in feeding these "aquatic vacuum-cleaners."

It is true that they do seem to ignore dry food; young specimens do prefer algae above other foods, but, when older they will consume *Tubifex* worms. In fact none of the *aymonieri* that I have possessed would refuse to eat *Tubifex* worms when fed to them as described.

Place a tight ball of *Tubifex*, approximately three-quarters of an inch in diameter, on to the gravel. Always feed on the same spot. The *aymonieri* will then place its head on the worms and then commence to suck at the *Tubifex*; when sufficient worms are in the mouth, the loach will lift its head and slowly devour them.

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It is a comical sight to see this happen, for the *aymasieri* appear to have a "red beard" waving and curling round their heads. I have seen a four inch leach entirely consume a ball of these worms at one sitting. I have possessed *aymasieri* that would even suck these worms out of a feeding bowl.

However, these "leaches" do not appear to be interested in single worms or those that are partly buried in the gravel.

There are two excellent substitutes for algae that the *aymasieri* will eat; spread boiled spinach or lettuce on to a flat rock. Their other requirements are: a sediment free gravel, clear, well oxygenated water. Circulation of water is advised here and when this is provided the *aymasieri* are more active. Temperature range: 73 to 78° F.

To conclude: I do not think that anyone can give cut-iron answers relating to the keeping of fish and tropical plants in the aquarium. There are too many exceptions to the norm: too many factors known and unknown involved.

Nonetheless, I find that experts answers on tropical fishkeeping, to be very interesting and certainly informative.

Yours faithfully,
STANLEY FOX.

Are Fish Conscious?

BECAUSE fish are unable to close their eyes as most mammals do when asleep it is not so easy for us to understand that this is normal as far as fish are concerned. A man blind from birth would know in his own mind what—say red colour was—but it may not be the same as our own idea.

Of course fish are conscious when awake, as proven by the fact that they can be trained to a certain extent to go to a corner of the tank when fed if they are always fed in the same place and at the same time.

Some fish choose their own mate among quite a number and will not mate with any other fish, if they were not conscious, any mate would do.

Fish are only able to sleep when the lights are turned off, because they have no eyelids and if the lights were left on they would soon degenerate.

I think this all adds up to the fact that fish do attain consciousness and do not rely solely on instinct.

Yours sincerely,
E. W. McFARLANE.

Mosquito Fish

WHERE have all the Mosquito Fish gone? As the author of the article in your September issue says, they are very interesting fish. Fifteen years ago it was possible to buy a couple for about 2/6 in any squarist shop—try buying them now! Could it be the very fact that they were once so common caused dealers to stop stocking them? You will notice that not one of your advertisers mentions them and I have tried several dealers who say they "sometimes have them in stock" as though they were something rather rare.

Yours faithfully,
REGINALD W. COLLETT.

Successful Show

I WOULD like through *The Aquarist* to mention the Annual Open Bethnal Green Show that took place on 2nd September, 1967. The response to my publicity was far beyond expectation.

I would like to thank all those Agents who contributed and the enthusiasts who entered.

I would like to point out that about 430 people passed through the doors to witness our Exhibition, which in our minds was a great effort attained by our Committee, and a special thanks for our Show Secretary—Mr. A. Collins.

I do think that through this achievement with the help of yourselves and the dealers and National Press that a National Open could be held in such a place, like Horticultural Hall, Westminster. Surely this would give the hobby a tremendous boost.

Yours faithfully,
L. R. SMITH, Press Officer,
The Bethnal Aquatic Society.

Torrey Canyon—Oil Tanker Disaster

I READ with great interest the article about the "Torrey Canyon," oil tanker disaster, which was written by the International Marine Study Society, in the August issue of *The Aquarist and Pondkeeper*.

So, I feel it is my utmost duty as an aquarist of tropical fish, to help my fellow friends of the I.M.S.S. This information would be of great help to this society.

Some time ago I happened to be reading an article (or better write-up) regarding a new Norwegian invention. This invention could be of great help to get rid of the oil which comes out of many tankers, when at sea. This oil is a deadly weapon to the marine fish; all over the world.

I suggest that the International Marine Study Society takes serious action regarding this new invention by Mr. Trygve Thune, Norwegian manufacturer who developed an apparatus designed to remove any oil from the sea surface.

This is what I read:

Removing Oil from Water Surfaces

Challenged by the constant pollution of Norwegian Fjords by ship oil leaks, Mr. Trygve Thune, a Norwegian manufacturer, has developed an apparatus designed to remove oil from the water surface. Demonstrating his invention in the Oslo fjord to an International audience, Mr. Thune convinced Oslo harbour officials that his barge efficiently separated the oil cover from the water surface, discharging the oil into the tanks.

Oil on the water surface is concentrated by Mr. Thune's "T-T" oil boom which forms a fence or wall kept in a vertical position. The oil concentrated in the boom is then drawn into the barge by means of a paddle wheel for separation from the water surface.

Perforation of the separator's bottom allows the water to pass back into the sea while the lightweight oil filled the room above the water surface, so that it can pass over the edge of the walls into another compartment from where it is pumped into a tanker barge.

The capacity of Mr. Thune's water surface cleaning device is the removal of ten tons of oil an hour, but there are no obstacles to building bigger units with greater capacity.

Well, I hope this information will do some good to save more marine fishes.

Yours truly,
JOSEPH JOHN MALL,
Pat House,
Church Street,
Paceville, St. Julians,
Malta.

THE AQUARIST

Coldwater fish-keeping queries answered by A. Boarder

Many queries from readers of "The Aquarist" are answered by post each month, all aspects of the fancy being covered. Not all queries and answers can be published, and a stamped self-addressed envelope should be sent so that a direct reply can be given.

What is the correct number of fishes for a pond to each 24 square inches of surface area?

You will find that a pond could hold more inches of fish to the surface area than would a tank in the house. The action of the winds and rain have a beneficial effect on the water in a pond. Do not however try to keep too many fishes in your pond. There is nothing clever in filling the pond to capacity with fishes. It is far better to have a few very healthy fishes than to over-crowd. These fishes are more likely to grow on well and also breed when they have plenty of swimming space. For a small garden pond, say, 10 feet by six and two feet deep, a dozen fishes about four to five inches long would be quite enough. The more fishes you have in your pond the more trouble will it be to keep the water pure and free from pollution.

I notice that my pond fish, especially roach and orfe, eat wild bird food, especially crushed oats. Is this a suitable food for fish when given with natural foods and dried insects?

I do not think that the crushed oats with the husks will be very good as a food for goldfish or orfe. I rather doubt their ability to digest the husks. However, I often use rolled or Quaker oats for feeding my fantails and I find this an excellent diet when used with other foods.

My tanks seem alive with Cyclops, although I have tried many ways of ridding the tanks of them. What else can I do?

Stop feeding your fishes in the tanks and I feel sure that they will soon eat up the Cyclops. Even if you have to withhold all artificial food for a fortnight this will not matter and the pests should be cleared up by then.

Does the Federation of British Aquarists recognise a fantail moor as well as a veiltail moor?

The 1947 standards recognised the Fantail Moor but in the later standards the Veiltail Moor was left out. However, later on it was decided to bring back the standard for the Fantail Moor. The standards for the Veiltail Moor are as for the Fantail and for the Fantail Moor as for the Fantail except that in both cases the colour must be a dull sooty black and the eyes must be telescopic with clear irises.

In my garden pond my goldfish have spawned and now some of the fry are an inch long and coloured. As most books state that it takes a year or two for them to colour up, can you explain why this has happened?

Most scaled goldfish do not change colour until the following year and some even longer than that. If there is any shubunkin strain in the fishes then they would colour up more quickly. It is probable that your fishes came from a mixed strain where there may have been a shubunkin cross at some time or other. It is a fact that this can produce a fish or two in a spawning which have shubunkin colourings even after twenty years or more.

I have three Roach in my pond and they are six inches long. Can they breed?

The Roach are large enough to breed but whether they do so depends on if there are the two sexes and that the

pond is large enough and has sufficient water plants to make a good cover and protection for the eggs.

I have found a powdery substance on the water plants in my pond. What is the cause please?

The powdery substance on the plants can be lime from the tap-water or fine sand from the base compost which has been washed up into the water by the fishes. If sand is in the compost it should be all cleared out. There is no need for any base compost as water plants can be set in separate containers which can be removed if necessary when the pond is cleaned out.

We have a stone sink in the garden with goldfish. Recently one has died and it had mould on its side and tail. What was the cause?

A stone sink in the garden is not large enough for keeping several goldfish. Such a container exposed to the sun would soon get too warm, when the water would lose much of its oxygen. This would upset the mucus covering of the fish and it would then be easy for the spores of fungus to enter the skin of the fish. If any more fish are affected treat with a salt bath, as often recommended in this magazine. In warm weather change some of the water—this should help, but see that you have no more fish than an inch to each 24 square inches of surface area.

I have built a pond in my garden about 6 ft. by 3 ft., and 18 inches deep. Please advise on the number and type of plants and fish to stock it with.

There is a lot of information which can be given to answer your query and the best thing for you to do is to get the book "Coldwater Fishkeeping" from *The Aquarist and Pondkeeper*, as advertised in this magazine, and you will find all the necessary information for stocking and maintaining a pond.

I have two goldfish in a bowl and at feeding time the larger fish drives the other away. How can I prevent this?

Get a proper fish tank and set it up with plants, etc., and you will find that with more space the fish will be much more contented. A tank 24 x 12 x 12 inches will be of a suitable size.

I have two golden orfe in a 20 in. by 12 in. by 12 in. tank. One fish is larger than the other and it has developed black marks on its body. Is this a sport?

The Orfe is not a sport. Many of these fish develop black marks on their bodies and there does not appear to be any reason for this although as the golden orfe is a sport or mutation from the normal Orfe it is possible for the marks to be a form of reversion. Several black marks on a fish would mean the loss of points at a show but otherwise they are not detrimental to the health of the fish.

What is the best way to kill an ailing fish?

Dash it smartly on a hard surface such as a concrete path. This has been the method adopted by fishkeepers for many years and I do not know of a better and quicker way.

Why does the water in my fish tank smell?

A fish tank will usually have a slight smell but not an unpleasant one. If the water is foul smelling it is probable that some uneaten food has decayed and polluted the water. If a tank is well planted with healthy growing water plants and the fish are not over-fed there should be no trouble keeping it from any bad smell.

Our experts' answers to tropical fish-keeping queries

A plant of *Aponogeton crispus* has grown well in my tropical aquarium over the last five months, but now it is rapidly dwindling away. Please can you give me any clue as to the cause of the trouble?

It is natural for plants of this genus to die down for a part of a year. During this resting period it is advisable to uproot the plant and place it in a receptacle which does not receive a strong light. A temperature in the neighbourhood of 65°F (18°C) should be maintained. After about three months of this treatment, the plant should be cleaned up (rid of all decayed roots and fibres) and planted afresh in the aquarium.

Is it known who was the first dealer/aquarist in this country to bring in tropical fishes by air?

Messrs. L. Katterns and the late Arthur Derham were the pioneers who first imported fishes into this country by air. To the best of our knowledge, the first air-load of tropicals arrived in this country in the early 1930's.

Why is *Labeo reticulatus* popularly known as the guppy?
This livebearer derives its common name from the Rev. Robert John Lechmere Guppy, who first sent to the British Museum, in 1866, a number of this species which he had collected in Trinidad.

Is it a fact that the common goldfish can stand excessive heat better than most of our so-called tropical aquarium species?

Provided goldfish are given plenty of swimming space in well aerated water they will not suffer any injury to their health if the temperature creeps up to 88°F (31°C) or more.

As a beginner I should like to know how to fill an aquarium without disturbing the sand. Introducing water from a watering can or garden hose always results in a saucer-shaped depression under a hanging cloud of fine particles. And this even when the water is poured on to a sheet of stout paper or a dinner plate.

Try pouring the water on to a piece of wood about 9 in. square. As the water rises so will the piece of wood. The sand underneath it will stay quite flat.

Is there any important difference between ordinary methylene blue and the so-called medical quality methylene blue?

There is a lot of difference between the two qualities of the "blue". The ordinary "blue" used in industry is tetramethylthionine and zinc; the "blue" used in medicine is methylthionine chloride. Methylthionine chloride is the drug to use for the treatment of certain diseases affecting aquarium fish.

I have just acquired a small albino *Clarias* catfish. Please can you tell me whether this fish is a distinct species or a mere colour variety of *C. anguilla*?

The albino *Clarias* is a white form that occurs in nature of a greyish catfish scientifically known as *Clarias batrachus*. The greyish fish and its albino counterpart are widespread over south-east Asia. *C. anguilla* is found only in West Africa.

My dealer has some slim-bodied botia loaches which he cannot name. They are a light silvery green to greenish grey in colour, with grey bars, and a dense peppering of grey spots on the sides. Can you help?

In all probability the loach in question is *Botia bedfordi*. This species hails from Thailand and attains about the same length as the better-known clown loach (*B. macracantha*). It is an excellent scavenger, but feeds mainly after dark. In its larger sizes it is best kept separated from much smaller species.

Is it true that the offspring of the gold tetra (*Phenacogaster anostomus*) are never so handsome as the parent fish taken from the wild?

It is said on good authority that all the young of this tetra produced in captivity lack the golden lustre of their parents. No-one has yet come up with a reason for this difference in pigmentation.

One of our club members said that he never feeds tubifex worms to his fishes because the worms themselves harbour other worms that live parasitically on fish. Is this correct?

We have read somewhere that a parasitoid worm does inhabit the gut of tubifex, but does not continue to live after it reaches the intestines of a fish.

Is the American black-nosed dace (*Pleurocheilus amarus*) suited to a tropical aquarium?

Provided that the aquarium is a large one and is not overstocked and the temperature is kept within a range of about 64°F (18°C) to 75°F (24°C), the American black-nosed dace should do as well as any of the hardy exotics.

Recently I came across a small pond in which there are plenty of glass worms for the taking. Are these larvae suitable for all fishes?

Yes, all fishes with the exception of the very small, for fry; for the larva is capable of inflicting damage on fry or some very tiny fish such as small male guppies.

In a pre-war aquarium magazine I came across the statement that labyrinth fishes are often collected from waters polluted by excessive decaying vegetation. Can this be true?

As labyrinth fish are not dependent on their gills to extract oxygen from the water, then it is reasonable to assume that pollution, provided that it is not too great or of long duration, will not shorten their lives or cause them any distress.

An aquarist friend told me that he keeps cichlids for the sole purpose of providing *Jupia* for various fry. Do you think he was pulling my leg?

Water siphoned into a jar from the bottom of a cichlid tank (cichlids, of course, that eat large quantities of earthworms and meat) is almost certain to contain sufficient infusorians to make a starter-culture for feeding to fry.

I should appreciate some information on the temperature requirements, preferred food, and breeding habits of the Congo tetra.

The Congo tetra (*Phenacogaster interruptus*) thrives best at a temperature in the neighbourhood of 75°F (24°C). It is not a faddy feeder and does well on a mixed diet of live, flesh and dried foods. Breeding takes place among plants. There the pair get together and the female scatters eggs that hatch out in about a week. The fry become free-swimming about two days later and need tiny daphnia, brine shrimps and the like, from the start.



The Congo tetra

THE AQUARIST

Marine queries answered by T. Ravensdale

What is the English coastal pipe fish known as?

It is probably the broad nosed pipe fish (*Siphonotus Typhle*) which is eastern Atlantic ranging from Norway to Gibraltar. It grows to 1 in. in length and is closely related to the great pipe fish.

One often hears of a "John Dory." Is this a marine fish?

The John Dory (*Zoia faber*) is most certainly a fish and one which is hardly mistakeable due to its immense trailing dorsal fin, laterally flat body, large head and enormous mouth. It also has a large black mark on either side of the body known as St. Peter's thumb-print. Some people believe the John Dory keeps the herring shoals together rather like a shepherd's dog. It does, in fact, eat the herring. It grows to 12 in., and can be found from southern England to Spain.

I have several wrasse which I have caught at Brighton but can find no identification for them, can you help?

The commonest British water wrasse is the Ballan (*Labrus bergylla*). It is brown to red, has 24 rays on a long dorsal fin, has a dark back and a light patch on each scale. The fins are blue-green with red spots. Sometimes dark bars run vertically through the body. It grows to a maximum length of 24 in.

The cuckoo wrasse (*Labrus mixtus*) is a more slender fish with a more pointed nose and shallow belly. It is orange on the sides, dark on the back and with bright blue horizontal lines splashing the body. The females have dark

spots below the dorsal fin.

The rainbow wrasse (*Coris julis*) is a rarer fish in Great Britain and is easily identified from other wrasse by having no scales on the head and gill-covers. It also has pointed pectoral fins. It is mainly green with a silver belly and a silver line running through the body. It seldom exceeds 6 in. in length.

Other wrasse found at the south coast include: Gold-sinny (*Ctenolabrus rupestris*), *Centrolabrus exoleus*, *Labrus surcula*, *Acantholabrus pallens*, *Ctenolabrus melops*.

Book review

The Sea

THIS is a large and handsome volume, beautifully and lavishly illustrated with black and white and colour photographs. Within the compass of three hundred pages the author has managed to deal very skilfully and attractively with all the aspects of his subject—the origin of earth and sea; undersea geology, winds and waves, tides and ocean currents; life in the sea; the coral reefs; the art of seamanship and voyages of discovery; world fisheries and other industries which harvest from the oceans; underwater archaeology; diving equipment and living under the sea etc., etc. A very comprehensive work crammed with information and interest while managing to be as gripping as a well written adventure story.

The quillworts *Isoetes* sp.

by Philip Swindells

THE quillworts (*Isoetes* sp.) are a genus of hardy, submerged, aquatic pteridophytes suitable for cultivation in both the garden pool and coldwater aquarium.

The principal species is the Common Quillwort (*Isoetes lacustris*) which in its wild state is found growing on the beds of lakes and tarns in the mountainous regions of Great Britain, Northern Europe and North America. The stiff quill-like leaves are dark olive-green and arise from a small circular brown corm. Under natural conditions the leaves often attain a length of some eight or ten inches, become slightly flaccid, and move and sway with every ripple of the water. When grown in an aquarium or pool, however, the leaves rarely exceed four inches in height and stand firm and erect like very stout porcupine quills. At the base of each quill is a small swollen area that encloses the hard round spore capsule which contains both the reproductive elements: megasporangia and microsporangia. The plant fruits during May and June, but unless one is very observant this process is likely to go on unnoticed, and indeed to the average aquarist proves to be of little consequence.

In addition to the true species there is a large and most desirable variant (*I. lacustris* var. *Mores.*), with leaves some one-and-a-half to two feet long, which can be found growing naturally in deep water in certain areas of Southern Ireland. Unfortunately, this variety does not at present appear to be in general cultivation.

A species which is very similar to *I. lacustris* is *I. echinospora*. Although superficially much like the Common Quillwort, and classified by many people as a "low-land" form of the same, this plant differs markedly in its natural distribution and in several major botanical characteristics. It is however, doubtful whether there is anything to be gained by growing this species in preference to *I. lacustris*, as all the external differences are very small, making the difficulty experienced in procuring good quality plants of this variety seemingly unjustified.

The Guernsey Quillwort (*I. hystrix*) however, is worth seeking. For this plant is like a diminutive form of the Common Quillwort, with slender thread-like leaves no more than two inches high clustering very tightly in a rosette around the small brown corm. When viewed through the water these attractive little tufts of quills look like little patches of freshly sown grass swaying gently in the water. It is folly to attempt to establish wild collected plants of this species in a pool or aquarium, as one will find that in their natural haunts they are completely submerged only at very irregular intervals, and as such do not take kindly to being suddenly and permanently immersed in the water. Therefore it is deemed advisable to pay what may seem to some an extortionate price, for healthy young plants which have been cultivated completely under water, as success with these is almost assured.

The Japanese newt

by Jack Hems



ONE of the prettiest newts imaginable is the 3½-4 in. *Triturus pyrrhogaster* from N.E. China and Japan. Although it is commonly called the Japanese newt, it is also known as the red- or fire-bellied newt on account of its fiery coral underparts, which are spotted and bleached, especially around the margins, with a rich chocolate brown inclining to reddish. The rest of the body is of a similar reddish brown hue. Both sexes have a raised line or ridge extending down the middle of the back, and a pouch-like swelling around the vent, but in general the male may be distinguished from the female by his slimmer and shorter body and more noticeable bulge between or rather to the rear of the hind legs.

The great attraction of the Japanese newt, apart from its decorative charm, is the ease with which it may be kept in a small tank. Unlike our native newts, which seek, and need, some moist secluded lurking place on land as soon as the breeding season is over, the Japanese newt does not seem opposed to living in water all the year round.

A tank measuring about 14 in. in length is large enough for a pair. It should be furnished with a flooring of washed sand or fine grit, some coldwater plants to provide oxygen, and a small rock with a part of its surface just clear of the water for the newts to clamber over or rest on at will. Although *T. pyrrhogaster* is a hardy creature, with a wide temperature tolerance, common-sense demands that it—or rather its tank—should be protected from exposure to excessive sunlight or icy draughts. Its tank must also have a cover of fine-meshed gauze (painted, if of metal, to afford some protection against rust) or glass raised slightly off the top, so that the newts can breathe but not escape (newts—most newts—are persevering climbers).

The Japanese newt is carnivorous in the widest sense of the word. It feeds in nature on a variety of small aquatic and terrestrial creatures, but in the aquarium it will flourish well on restricted diet of lean meat and earthworms. Food is taken with a quick snap of the mouth. If the first snap misses the mark it is followed by a few more snaps in rapid succession. If these, too, miss the target, all interest in food is lost for the time being.

It is not necessary to offer food (a small earthworm or a thin sliver of meat makes a meal) more than twice or thrice a week. Also, it is recommended that all meat should be offered from the tips of a blunt-nosed forceps. Strict adherence to this practice will guarantee that each newt receives its proper share of food without any meat being left over to foul the water. Which prompts me to say that fairly frequent use of a dip-tube to remove excreta and vegetable wastes will keep the water clear and wholesome for a very long time.

It is rare for a pair of Japanese newts that have been kept in a warm room throughout the year to breed in captivity, for several weeks or a few months of cold, with temperatures as low as the forties (°F.), are necessary to slow down the body mechanism (interest in food and physical activity diminishes with a diminishing temperature) and prepare it for breeding during the longer and warmer days ahead. Expressed another way, a period of semi-dormancy has a recuperative and tonic effect.

A female newt ready for fecundation shows an increase in girth, a marked bloatedness. She is, moreover, more active than usual, climbing in and over the plants and walking slowly about the bottom, with an air of purpose in her gait. Meanwhile the male, made aware of her condition by scent, sight, or some strange telepathy (or a combination of the lot), responds to the magnet of her sexual attractiveness by curling and uncurling his tail, and, every so often, lashing it from side-to-side. Besides this play he frequently raises himself or moves on the sand on the tips of his fingers and toes. I have also seen a male swim on to the female from above and then, after a momentary embrace (or so it seems), slither forward and downward to the floor. Sometime during these amorous friskings he extrudes sperms enclosed in a jelly-like substance which the female discovers, and straddles over. The jelly-like substance or spermatophore adheres to her genital opening and releases the sperms into her body. A week or so later egg-laying begins. She wraps the sticky coated eggs singly in the foliage of water-plants, using her feet like hands. The leaves of such plants as the elodea and callitriche are especially favoured, presumably because they are easy to fold and secure in position.

The young tadpoles are of a greyish silver hue, darker above than below, with long fins on the dorsal and ventral surfaces of the body and feathery tufts just behind the head. These are gills through which oxygen is taken from

Continued opposite

THE AQUARIST

The true water spider

by Bill Simms

ONE of the most interesting of all our native water creatures is the Water Spider, *Argyrota aquatica*.

There are many spiders that have a lot to do with water, like the Raft Spider, which constructs a raft of leaves, floats on the water with it, and on seeing a possible victim immediately walks over the water surface to secure it.

The true water spider, however, spends all its life below the surface, for though it breathes air, it feeds, breeds, lays its eggs, and rears its young entirely below the water surface.

For this reason it is easy to study in an aquarium, and because its wants are simple—just a regular supply of small water creatures as food—many have been installed in small aquariums. These should have a fine gravel bottom, and plenty of plants with suitable lighting so that they provide the ideal under-water conditions the spider likes and where it can be watched very easily.

One of the first things to be observed is the making of the air-bubble nest that enables this spider to live in water. Having chosen a suitable spot among some weeds, the spider anchors a number of threads, and then swims upwards, paying out threads as it goes.

At the surface the spider breaks through, waves its legs about to dry them, and then re-submerges. Now, however, it is encased in silvery air bubbles and these would normally prevent it from swimming downwards because of their buoyancy. This is where the anchored threads come in, for with their aid the spider is able to pull itself right down to the selected nest site.

Once there the air is released carefully, and in such a manner that it is trapped by the vegetation and threads woven there by the spider. Then more threads are woven over the bubble until it is completely trapped, and forms the nucleus for the cleverly contrived nest of air. This is topped up, as required, by further trips to the surface.

Because of the upward pressure of the air the restraining threads of silk always take the appearance of a round-topped tent, and being under water the nest glitters like silver. To watch the construction of such a nest is well worth the trouble of setting up the aquarium; but there is much more to see.

Feeding the water spider is easy. *Daphnia*, and other similarly sized water creatures, can be provided, and it is amusing to watch the agility with which the spider catches its prey.

If your spider aquarium is large enough you can watch the breeding of these water spiders, too. The male has to be careful in his approach, or he will be eaten. However, if he is successful there will soon be a batch of eggs stuck to the inside top of the nest—clear of the water.

The young, when they hatch, must be kept dry until



they have grown the covering of velvety hairs that will make them waterproof. Then they can venture out into the water and find food for themselves.

In ponds and slowly moving streams the water spiders go into a state of semi-hibernation. To do this they choose deeper levels for their winter nests and there, where there is little chance of frost affecting them, they sink into a deep sleep.

An indoor aquarium, being warmer, may not induce this semi-hibernation but close observation will show that the entire metabolism of the little creature is slowed down, and it may decide to build new, lower-level nests.

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The Japanese newt

the water. The really tiny forms of pond life are eaten as first food.

With increasing size comes a change in colour. The back darkens and the belly develops reddish tones. The limbs that start as tiny buds begin to lengthen; first the fore limbs, then the hind limbs. Larger food, such as *Daphnia*, is included in the menu. With the disappearance of the gills, some weeks after the appearance of the hind limbs, the newt changes from a gill-breather to a lung-breather. But all this takes place gradually, and several months may elapse before the young newt looks like a smaller edition of its parents.

The Japanese newt has not always borne the generic name of *Triturus*. At one time it was referred to the genus *Cynops* (some herpetologists argue that the Japanese newt should still be known, formally speaking, as *Cynops triturus*) and before that as *Molge pyrrhogaster*.

Given proper care and attention the Japanese newt will stay alive for many years. As a matter of fact, Alfred Reutcher, in his *Vivarium Life*, records that it has lived for 28 years in captivity.

Reptiles and amphibia in Portugal

by H. G. B. Gilpin

FOR anyone who has fallen under the fascination of these interesting and often beautiful creatures, a holiday in the rural districts of Portugal is a memorable experience. A small party of us spent a fortnight there in March, driving across France and Spain to Rossio which we made our base.

Our first excursion was to a private game reserve at Golega. Leaving the car by the side of some rice fields at the entrance, we walked along a tree-lined path, bordered on one hand by a stream, and on the other by a wide sheet of water which supported a profusion of water crowfoot intermingled with frogbit and water lilies. Willow trees grew along the banks and from the water providing areas of shade from the brilliant sunshine. An immense frog population inhabited the water, the loud, though not unmusical, croaking of the frogs providing a continuous

background of sound. Dragonflies, bumble bees and a host of other insects afforded an enormous reserve of food for the amphibians which in turn attracted numerous waders such as Grey and Purple Herons, Egrets and Godwits and predatory birds such as Common and Black Kites to the area.

As we walked along the path, frogs, disturbed by our footsteps, "plopped" into the water in front of us. A stealthy approach enabled me to secure a few specimens which proved to be *Rana esculenta*, beautiful little olive green animals with large, irregularly shaped brown markings and a vivid green dorsal stripe.

In the Foros do Arros, a forest of cork oak and eucalyptus trees, two Ocellated Lizards scuttled for the shelter of a loose stone wall as we came nearer. A short distance into the forest we came to an open level patch with rising



A pair of wall lizards *Lacerta muralis*—excellent climbers



Typical lizard country in Portugal, tree frogs are also to be found in this terrain

ground covered with cork oaks, broom, sun roses, gorse and heather on one side, and marshy land through which a small stream trickled on the other. Amongst the trees we saw a very beautiful, eight inches long, olive green lizard with yellow underparts and a deep, blood red face. It was extremely active and, although it posed long enough for us to get a good view of it, it vanished into the undergrowth at the first signs of movement.

Many small Edible Frogs were congregated in the water and amongst the forget-me-nots and water plantains pushing upwards from the shallows. These showed some colour variations from those seen in Golegs, being brownish rather than green with a darker lateral line on either side of the central green dorsal stripe and half an inch from it. The principal insect inhabitants of this area appeared to be large grasshoppers and innumerable ants.

Returning along a pathway through the forest we had a good view of a large five-foot long Montpellier Snake. So dark in colour as to be almost black, it moved slowly across the path as we approached and then, accelerating rapidly, took cover in a dry, stony patch of ground thickly overgrown with broom. An immediate search yielded several further glimpses of the snake as it slid between the close growing lower stems of the bushes but their density prevented any hope of capturing it and it finally disappeared completely. These snakes feed largely on small mammals, birds and lizards which they kill with their poison fangs. The bite, however, is not apparently dangerous to humans. A Portuguese friend, to whom I described this snake said he was familiar with the species and believed it was not seriously harmful. Nevertheless, he added, he always avoided contact with them!

We spent one particularly interesting day on a farm near Castello de Vide not far from the Spanish border. This was an ideal place in which to search for reptiles. Great grey boulders dotted the dry stony ground. White broom,

foxgloves, chamomile and the bright yellow flowers of angel's tears grew amongst the coarse grass. The wide, sun-drenched fields were separated from each other by loose stone walls and on both the walls and the boulders many Wall Lizards scuttled and sunned themselves.

At the foot of the walls a number of Ocellated Lizards were seen. The largest members of this species were observed amongst the grass at the base of some farm buildings. One in particular, a good two feet in length and two inches across the top of its head, retreated into a crevice beneath a huge boulder just out of reach but clearly in view. Its treatment of a stick, gently pushed towards it to encourage it out into the open, gave ample indication of the power of its jaws and a firm warning of the painful nature of its bite. Eventually it did bolt with extreme rapidity and was lost to view.

These Ocellated Lizards, *Lacerta l. lapida*, are magnificent animals, their impressive proportions and green coloration, with rows of large blue patches along the sides, forming an eye catching combination. Largely ground dwellers, they feed upon small mammals, other lizards and insects. We saw many of them in Portugal, not infrequently scurrying across the highway.

One of the most interesting spots we visited lay just off the roadside not far from Castello Branco. A stream meandered between enormous grey boulders, widening in several places to form large pools of clear water, before disappearing beneath a stone bridge. We clambered down a steep grassy slope for a closer examination and were very glad we did so. Apart from many small frogs we found, of all the unlikely creatures to meet miles from the nearest village, a solitary goldfish swimming in one of the pools.

In another pool two small heads appeared above the water within easy reach of the bank. I made a quick grab and was rewarded with the capture of a two foot long, olive green Grass Snake with yellow lateral spots. I was

fortunate in grasping it immediately behind the head and was consequently able to examine it more closely at leisure. Whilst being handled it gave off no disagreeable odour but when placed on the ground hissed disapprovingly and made off at considerable speed for the nearest water.

One sees many snakes, both alive and dead, on the roads in Portugal where they provide easy meat for predatory birds. On one occasion a Red Kite swooped in front of the car as we were driving along, seized the body of a snake and swept away with it dangling from its talons.

Apart from several species of vipers, the majority of snakes found in Portugal are harmless, or at least not dangerous to humans, whilst the lizards are all harmless and may be safely handled with the exception of the larger Ocellated Lizards which, although not venomous, can inflict a painful bite.



Above
Farm near
Castells de Vide,
home of large
ocellated lizards



Left
Edible frog
Rana esculenta,
this species is
very active but
seldom strays
far from water

The bearded rocklings

by Eric Hardy, F.Z.S.

FEW fish are so often overlooked as the common rockling, which inhabits most of our coasts, even polluted river-mouths like Perch Rock in the Mersey, without attracting much interest from either sport-anglers or commercial fishermen, much less the amateur aquarist. There are three species of these agile, writhing inhabitants of the weedy, shallow, rocky seabed. Here they are most easily obtained by turning over large stones and boulders at the lowest-most ebb of spring tides. Though a little like their distant relative, the freshwater burbot, they all have a continuous dorsal fin along the back, except for a vibrating fringe at its front (the vestige of the former first dorsal fin) and a single ventral fin along the belly. Also, their long, muddy brown tubular body has such small scales that from their struggles to escape you might think you have an eel.

They are most easily distinguished by the barbels on the upper jaw, for all have a single beard or lower barbel. The widespread three-bearded kind, largest of the three, has two more on the upper lip; the four-bearded kind has three on the upper lip, while the common and bigger five-bearded species carries four "feelers" above its mouth. *Ovo riverrata* (or *Merula* ?), the three-bearded rockling, may be spotted with darker brown in a clean or preserved specimen, but this isn't so quickly seen when you grab it from under the stone when your gumboots are ankle-deep in sloppy mud. The silvery young are even more difficult to distinguish. Although this species grows to 20 inches in length and is sometimes confusingly listed in abbreviation as "ling," most of the specimens we find are six or nine inches, probably because rocklings generally spend their first year of life in inshore waters.

This used to be nicknamed St. Mary's Trout in North Wales, and I am writing this exactly 100 years since a record 19-inch specimen was caught near Bangor in August 1867. The nickname was probably given it by the monks of old Bangor cathedral catching it in their weir in the Menai Strait about 8th December, the Feast of the Conception. It is the common kind on the north Devon coast, commoner than the five-bearded.

The spotless four-bearded species, *cristatus*, is scarcer and hasn't been recorded so large, while the five-bearded *susellus* is more restricted to inshore waters, even spawning in rather polluted estuaries. In the Bristol Channel the latter is known as "Slippery Cod" and is eaten. All their eggs drift with the plankton, in spring and summer, and they all seem to favour rocky or seaweed beds where they can hide. When they are just over an inch long, the "mackerel midges" as their young used to be known, from their large pelvic fins, begin to lose their silvery appearance and sink to the bottom for their adult life. It is at this stage that they are most easily kept in the aquarium. However, the eggs were hatched in an aquarium, by Brook, in five or six days, so far back as 1884. Of course, if they are fed too heavily they will grow to large propor-



tions in a few years. Like very young whiting and cod, which are near relatives, they are sometimes found in the sea, living in company with jellyfish, probably partly for the protection the stinging tentacles give these fish, keeping predators, and partly for scraps they may obtain from the jellyfish's food.

With a good filter and plenty of sand at the bottom, and all stones scrubbed clean before being added, the tank should last some weeks with only occasional topping-up with tap-water to compensate for evaporation, but with the occasional addition of sea-water. Overcrowding is a common fault with early ventures into a marine aquarium. Shellfish, like filter-feeding mussels, may have interest and use in a tank, but they must be watched for deaths, when their shells gape a little more, and removed immediately otherwise they quickly rot with harmful results.

Rocklings aren't the only fish you'll find by turning over big stones thick with hanging aprons of seaweeds in shallow rock-pools at the lowest ebb of the tide. Around the Isle of Man and Wales for instance you will often come across small blennies, gobies, worm-pipe-fish, suck fish and 15-spined sticklebacks this way. Like their larger relatives, the deep sea ling, rockling have more and larger teeth than has the river-burbot. They all feed on small fish fry and animal life, according to their size, being bottom-feeders as their barbels indicate.

All three species may often be seen in the Marine Biological Association's public aquarium on Plymouth Hoe. They can be transported quite easily in a plastic bag of sea-water, but they don't want to be in glaring light all the while. They are fish of the dark and weedy waters, more active by night, and fond of searching the nooks and dark corners rather than being in the centre of view swimming round like goldfish unfortunately confined to glass bowls of nothing but water in the window's full glare. They are safe to keep with larger, non-predatory fish, and with plant life. Shy and frightened at first, they will settle down and become less retiring in time. Some green seaweed anchored to the bottom will be a useful addition to the tank, if the smaller kinds are used, such as common green laver, like translucent lettuce. If not anchored, this will hang from the surface equally well. A handful of sand-hoppers can be added from time to time for food.

The future of coral fish

by T. Ravensdale, F.B.I.S., F.B.S.S., a.m.Z.S.



Above.
The author
surfacing
after one of
his own
expeditions
in search of
coral fish.

**Far right
colour.** The
blue angel
fish (*Angel-
scithys
ciliaris*)



The future of coral fish—continued



ON 9th January, 1960, a self-contained diving apparatus, "Trieste," was towed to a position in the Pacific calculated to be exactly above the deepest place on Earth, the Marianas Trench, an immense canyon gouged from the Earth's crust in pre-historic times. A heavy sea made operations difficult but eventually two men, Piccard and Walsh, managed to clamber aboard and bolt out the world.

The Bathyscaph, as it is called, rolled wildly whilst delicate instruments were checked for the last time until finally a valve was opened to allow tons of Pacific to enter the water tanks and the great dive had begun.

At 8.30 a.m. the rolling action of the violent sea above ceased and an eerie calm belied movement at all. The bright blue light gave way to stygian blackness as they sank deeper and deeper until, at 300 feet, the instruments indicated that the Bathyscaph had stopped. The Thermocline region, where water is colder and denser, had been reached and they were suspended, floating at mid-depth.

Large tanks in the hull had been filled with petrol, which

is lighter than water, to aid ascent at the end of the dive. The lower temperature would have contracted it to allow extra room for water to be taken on thus making the craft heavier and allowing a further descent, but oxygen was of prime importance and time could not be afforded to wait for the petrol to contract and so a decision was made to jettison petrol and make room for the less buoyant water. This decision had to be made several times again with anxiety growing for the Bathyscaph was continuously changing weight and was at one stage actually rising, but eventually the Thermocline region was overcome and the descent became more stable. Two thousand feet was reached in twelve minutes and once again instruments were the sole evidence of movement. The tiny craft plunged downwards at the rate of two feet per second until the incredible depth of twenty-five thousand feet was reached. The speed was then retarded by the simple expedient of releasing small "cannon balls" which made the craft lighter thus slowing progress. The next five thousand feet were covered at the slower rate of one foot per second.

The bottom was expected to be at a depth of 33,600 feet but at 33,000 feet (6½ miles down) the crew were perturbed to find no register on the echo sounder whatsoever. Underwater lighting equipment was switched on and a powerful beam fingered into the darkest corners on earth, but to no avail. Slowly the incredibly complex machine drifted downwards, the most modern device in our planet in the most impenetrable corner existing. 2,000 nerve wracking feet of anxious peering into the gloom with probing search-lights availed them nothing until suddenly, at 1 p.m., the echo sounder began to breathe. The bottom was near. Eight hundred feet later the bathyscaph gently sank into the powdered sediment. Seven miles below the surface of the Pacific two men had reached the bottom of the deepest abyss on earth.

The one incredible aspect of this equally incredible voyage is the fantastic amount of time, effort, study and cost that must have made the actual dive possible at all. Man's quest for knowledge is insatiable and attempts to gain more are applauded by all and yet it is my firm belief that for once in his life man is starting at the wrong end of the problem. He is prepared to go to any lengths for information from the very bowels of the sea and yet he has hardly a notion of what goes on at its surface. Surely one should learn to swim in the shallow waters before plunging into the depths. Within reach of any average swimmer is the fantastic underwater gardens of the coral reefs complete with creatures so startling in shape and colour (the most vivid colours on earth can be seen in coral fishes) that one finds it hard to believe and yet we know hardly anything about them. We cannot even determine sex without resorting to surgery and breeding is a complete mystery. Surely we should attempt to name and classify the fabulous creatures within reach of our doorsteps before seeking the even more difficult deep sea denizens.

It is true that a few feeble attempts have been made by one or two Zoological Societies to keep coral fishes alive but this seems due to their public attractiveness more than



Above A beautiful specimen of a coral fish (*Amphiprion bicinctus*)

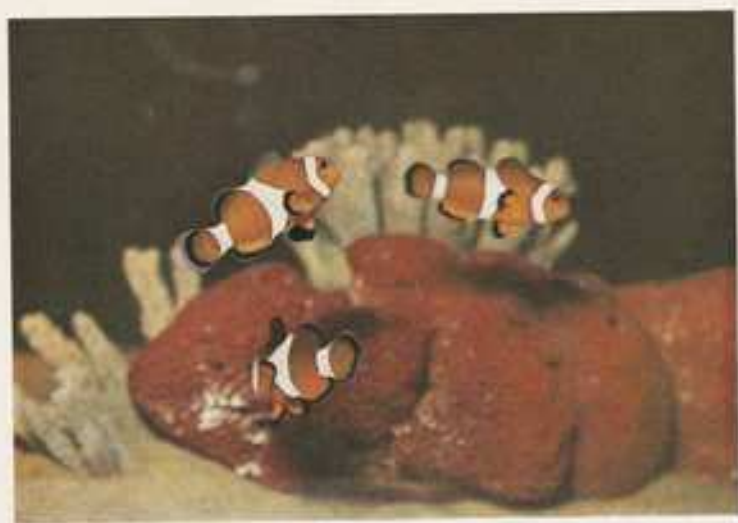
Right Coral sponges and brightly coloured shells form the marine landscape

Far right colour The clown fish (*Amphiprion percula*) provide an attractive sight in a marine set-up





The future of coral fish—*continued on page 225*



Some observations on the brown discus—Part II by Graham Cox

Sexing the fish

IN all the writings I have been able to find purporting to indicate how to sex *Discus*, I have found nothing which ties in with the *proved* sex of my own specimens (on the 10th April, 1967, the fish which I had decided was female spawned on the walls of the cave, with one of the fish I had designated as a male going through the actions of fertilising the eggs—and subsequently eating them an hour-and-a-half later). It has been said that the pelvic fins are differently shaped on males, taking a second downward curve to make an S-shape, whilst the female's pelvics are crescent-shaped. My female and males all have crescent-shaped pelvic fins. One authority suggests that the slight bump on the head of the male is more vigorous than that of the female. Despite many hours of observation I can detect no difference between the foreheads of the two sexes. Someone else suggests differences in the degree of pointedness of the posterior edge of the dorsal and so it goes on. I now feel that the only way to sex these fish is by prolonged observation of colour patterns, differences in behaviour and, of course, the slight swelling behind and below the pectoral fins of the mature female when carrying eggs. I must stress, however, that any one of these indications, taken and considered out of context with the others, may lead to inaccurate decisions with regard to the sex of the specimen. I have seen that *most*, but not all males, are slightly more aggressive than *most*

females, and that although the colour patterns of both sexes change extremely rapidly with change in mood, there is nevertheless slight sexual polychromatism, but I think the next section under the heading *Colour Patterns* will illustrate this point better than words can here.

The following points should be noticed:—

(a) With the exception of (c), (g) and (h) (right), the first and last of the nine body stripes are always the darkest and most clearly marked.

Feeding

This is a somewhat difficult aspect of the successful keeping of *Discus*, but with a little effort and experimentation the problem can be overcome. Initially I could only get them to accept *Tubifex* worms, but I have now got them to eat live adult brine shrimp, very finely chopped *red* earth-worms (they show little interest in the yellow worm species), white worms, *Daphnia*, mosquito larvae, and surprisingly, mussels collected fresh from the beach and chopped very finely with a clean razor blade. One of the males will occasionally take a little of a well-known German dried food; but only if he hasn't eaten for a day or so. I see no reason why tank-reared *Discus* shouldn't be trained to eat a good quality dried food, but mine are wild and would apparently starve rather than eat prepared foods regularly. It would appear that *Tubifex* worms, small

Table showing sexual polychromatism in the Brown Discus

	Male	Female
	a.	b.
Normal Colour	Body pale brown with medium brown stripes	Body light ochre with light brown stripes
	c.	d.
Aggression Colour	Perhaps the most dramatic example of polychromatism in the sexes. The dark stripes fade to a fawnish-green and the body colour deepens resulting in a juxtaposition of the light and dark areas	Similar to normal coloration except that the normally yellowish body coloration between the stripes darkens to a mid-fawn
	e.	f.
Submission Colour	Almost identical to (b) above, i.e., a submissive male adopts female's normal coloration	Body becomes dark greenish-yellow, stripes just discernible as mid-fawn areas
	g.	h.
Sexually-stimulated Colour	Body becomes saffron yellow. Head turns deep brown from eye stripe, round the gill-cover to base of the first stripe under the gill	As for male. There is little difference in coloration during courtship preliminaries between the sexes

Observations on the brown discus—continued

crustaceous and aquatic insect larvae form the diet of these fish in the Amazon. This is because their gullets are extremely narrow (or at least the gullets of my last two dead specimens appeared to be after dissection). When chopping earthworms and mussels, the pieces must not be larger than $\frac{1}{2}$ in. in diameter or the cichlids will spit them out, take them back into the mouth and spit them out again several times before finally deciding that that particular piece cannot be swallowed because of its size.

It has always been obvious that the pale blue coloration of the head and fin stripes is greatly heightened after a feeding of salt-water mussels. They also grow very rapidly on this diet, and I can only presume that the high salinity/high protein content of this food is responsible. In fact, Dr. Günther Szebe in his encyclopaedic work, *Freshwater Fishes of the World*, suggests that the addition of one tablespoonful of sea-salts to each two gallons of the aquarium water is beneficial to near-mature specimens, although I wouldn't think that these fish could possibly experience this degree of salinity in the higher reaches of the Amazon.

When describing the layout of the tank for Discus it will be remembered that I said several connecting areas were left free of plants. The reason for this is that when feeding Tubifex worms, inevitably several fall unnoticed through the bottom of the worm feeder, and burrow into the gravel. If the bottom of the tank is too thickly planted, the fish will be unable to retrieve these worms. However, if it is so arranged that the worm-feeding pot floats over a bare patch, the fish will retrieve them from the gravel by a very characteristic action. By suddenly clamping both gill covers closed, and reducing the volume of the buccal cavity, a powerful jet of water is directed from the mouth towards the established worms and "blasts" them out of the compost so that they can be eaten. In view of this, when furnishing a tank for Discus, one must strike a balance between providing enough plant coverage to make these nervous fish feel secure and leaving a few bare patches so that the fish can recover lost food.

Important precautions to be taken when keeping Discus

1. Discus are definitely not fish which take kindly to the presence of other species. Of the original five specimens purchased in February, 1966, one was killed within 10 days of purchase by a three-quarter grown male Angel fish (*Pterophyllum scalare*), which took exception to the Pompadour's interest in the large Amazon Sword plant. This, the first of the quintet to die, was a large female. Two





days later, a male died after a Sucking loach (*Gyrinocheilus cyprinoides*) had firmly attached itself to the fish's side. The Discus went berserk and beat itself to death against the walls of the tank before anyone could help it. It is possible that the mucus secretion which Discus produce, particularly after breeding, for feeding the fry, is attractive in taste to the loach.

In short, I would never again keep any other fish with Discus.

2. Blindness

In the densely overgrown stretches of water where Discus occur in the wild, it is obvious that not too much light will penetrate through to the water. I have seen two Discus already (not my own) which have been blinded by too intense light. A good indication of blindness (assuming that the cones is not opaque so that the reason for blindness is obvious anyway), is that the fish permanently adopts the pre-death dark brown coloration, since the chromatophores of the skin cannot be controlled by the fishes sight reflexes.

3. Fighting

In my experience a great deal of nonsense has been written about the so-called docility of Discus. Whilst it is true that they seldom molest other species, my two males have frequent and serious fights, consisting mostly of mouth-to-mouth attacks, threats and manoeuvring around each other without the exaggerated body-wagging of the male/female display movements. This aggression always occurs after feeding. It was to give the smaller of the two males a retreat that I built the cave previously mentioned (see photographs).

4. Fine gravel

A gravel larger than $\frac{1}{8}$ in. to $\frac{1}{4}$ in. dia, should not be used for two reasons—

- (a) It will not filter so effectively as the smaller grades, and,
- (b) the fish will be unable to blow it aside and recover lost worms.

5. Diseases and Wounds

(a) If the fish are kept too cold, i.e., at 75-78°F., they become very prone to a peculiar, possibly cancerous, growth in the mouth. These growths are grey in colour and resemble small pieces of cauliflower. They can be successfully cut away with a sharp scalpel or razor blade, and afterwards the raw flesh resulting in the mouth should be painted daily with acriflavine solution.

4 Showing the two males fighting viciously, using the normal cichlid tactics of mouth-tugging. Both males are showing the typical Discus male aggression colour, (refer Section c. in Table) in which the dark stripes/light stripes arrangement is in juxtaposition. The female at top is showing normal coloration (Section b. in Table) for her sex.

(b) Damage to the flesh of the head and body caused by fighting and accidental collisions with rocks can be prevented from becoming fungused by painting with acriflavine every two days.

6. Changes of Water

In conclusion, let me say that in common with others who have successfully kept Discus (my three survivors are still in excellent condition after over a year of living in their present tank), I strongly recommend a fairly frequent change of water. I exchange 10 gallons of tank water for the same volume of tap-water every three weeks. It would appear that this is effective in keeping the amount of dissolved plant nutrients, mostly nitrates, produced by the fish at excreta, at a low level. This depresses the Infusoria and bacteria populations which are harmful to the fish. I consider it possible that the reason why the Symphysodon species have evolved their skin-secretion fry food is because in their native rivers, the water has a high acid content and low hardness level. Consequently there are none of the micro-organisms present in harder, neutral waters which normally provide the first food for fry.

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Coral fishes

a genuine search for knowledge. Unfortunately, very few of these attempts have been successful and even the mightiest public aquarium seem to have given up the battle.

As with any field not attracting the attention of large authorities amateurs have taken the lead. This is not as discouraging as it may seem for nearly all pioneer schemes in search of knowledge have been piloted by amateurs. In fact, the first attempts to reach the bottom of the sea were made by amateurs and an amateur was the first to fly in the air. The responsible bodies only become responsible when the goal has already been sighted!

Coral fish keeping, due to its complexity and expense, is almost unknown in public aquariums and yet I know of many private enthusiasts who spend all their time, money and devotion in an attempt to keep tropical marine fishes alive in their front parlour—and they are succeeding! They have all experienced success to a moderate degree and can keep coral fishes alive sometimes for six months on end and yet there is hardly a zoo in the world capable of keeping even the common octopus alive for much longer!

As with all fanatics, and I must confess to being one, I am convinced that I have my fingers around the egg of truth in coral fish keeping and have expressed these views in a book "Coral Fishes" soon to be published by Foyles. The most extraordinary point about this publication, which explains how coral fishes may be kept and maintained in even the home aquarium, is that it is the first in this new branch of zoology to come from Great Britain. It is a pity that it had to come from an amateur.

Breeding goldfish—rearing the fry

by A. Boarder

IN my previous article I dealt with the hatching of the eggs and what could go wrong to prevent a good hatching. When the fry have actually hatched there are still a few things which can go wrong. The fry will attach themselves to plants or to the side of the tank when they first hatch. If any aeration has been used whilst the eggs were incubating it may be better now to either cut out this or reduce the strength. The fry should not be disturbed more than is absolutely necessary. They have a yolk sac attached to them from which they will get their nourishment for the first couple of days. If the water appears to be fresh and is not too cloudy the aerator can be dispensed with.

The fry will be free swimming once the egg sac has been absorbed and it is then that the fry will be searching for food. This first food must be very small and in native waters this is present in the water as a form of tiny animal life known as infusoria. Infusoria can be cultured by various methods and the chief methods are to provide a water with some decaying vegetation on which the infusoria can feed. Usually this water is not very pure for the fry and so there can be some danger if too much of the polluted water is added to the fry tank. I find that the safest method of feeding fry in the early stages is to use the tubed food in liquid form. This will be eaten by the fry and is not as likely to pollute the water as infusoria, although it will be found that the addition of this liquid food will encourage the formation and growth of infusoria. A few drops a day will be enough unless there are a large number of fry in the tank.

Naturally the number of fry will regulate the amount of food which is given and at no time will it be necessary to give too much which could pollute the water. If there are some water plants in the tank the fry will be feeding from these most of the time. They appear to be able to find plenty of tiny live food among the fine-leaved plants. If the method of breeding has been to take water plants with eggs from a pond for hatching in safety, it is almost certain that there may be some forms of life in the water. Any water snails among the plants will not be of any danger now that the eggs have hatched but there may well be other forms of life which could devour the fry.

If there were any newts in the breeding pond it is almost certain that some of their tadpoles will hatch out in the hatching tank. When they first hatch they can be distinguished from fish fry by their colour and shape. They are thicker in the body and paler in colour. They are also slower swimmers, as when the fry do swim they move swiftly in the water, much faster than do the newt tadpoles. There could also be the larvae of water beetles or dragon flies as well as water boatmen. All of these could eat the fry. Although the newt tadpoles are slow at first they soon grow and at a faster rate than the fish fry. They are then able to eat many of the fry as they appear to lie in wait for them as they move around feeding.

Over many years with varying success at rearing fry I

have found that the very safest method to adopt is to move the fry into a fresh clean tank where as far as you can manage the water is quite free from any pests which might be dangerous. It may seem to be a very difficult task to catch the fry in order to put them into the fresh safe tank. I have found that the best way is to get the spare tank set up with matured water and with a few pieces of water plant. These plants must be thoroughly cleansed with some permanganate of potash to a beetroot colour before being placed in the fresh tank. Do not use fresh tap water in the new tank but use only water from a pure pond or tap water which has stood for a couple of days in the open air. Having the tank ready, a white milk saucepan or similar object can be used to scoop up the fry. Once the pan is half filled with water and some fry, it can be tipped to one side and some of the water run away. Any pests can now be seen quite easily and removed. The fry can be gently poured from the pan into the tank. They can be counted whilst doing so. If the fry are allowed to run into the tank gently there will be no danger to the fry. At the same time, by making this change the fresh tank will be much safer from any impurities than would be the old hatching tank.

Providing that due care has been taken when preparing the fresh tank there should be no more trouble from any of the larger pests; that is those which are easy to see with the naked eye. However there may be trouble from such pests as flukes or from forms of Fungus disease. It may be thought that it would be safer to use no water plants in the new tank but I have always been of the opinion that the fry are more contented with at least some plants, also they can be seen browsing among them most of the time obviously finding tiny forms of life for food.

The question of warmth will arise. There can be no doubt that the fry will grow much more quickly if the water temperature is in the neighbourhood of 70°F. I have usually managed to keep the fry tanks warmer by keeping them in a large garden frame. This has electric heating by cables regulated by a thermostat but is never kept at anywhere near the above temperature at all times. During the day-time the frame warms up considerably and all inside it becomes very warm. This is mostly held all night but I am not in favour of keeping a steady temperature both day and night, neither did I do so when I kept tropicals. I feel that it is more natural for the water temperatures to vary by day and night.

The liquid fry food will be sufficient for the fry for at least the first week of feeding. Their rate of growth will depend on the temperature of the water, the amount of swimming space and the availability of suitable foods. The first feeds can be when the fry are free swimming and this depends mainly on the temperature of the water. At 70°F., or about, the fry will soon use up the yolk sac and be ready for food, whilst at a lower temperature it can be a day or two later. At the recommended warmth the fry will be free swimming in two days and can then be fed. If a little

liquid food has been added to the hatching tank when the eggs were introduced there is likely to be some infusoria already in the tank when the fry are ready for it. Do not add too much before hatching as there is always a possibility of fouling the water.

The next stage in feeding after the liquid food is something slightly larger but still not too big for the small fry to take. Be advised by the rate of growth and never try to feed with any food which is too large for the fry. Great care must be taken to ensure that nothing is done which can pollute the water in any way. I have found that it is a good plan to change a little of the water in the fry tank every day. In a six gallon tank about a gallon can be carefully removed. This can be done with the sump can so that no fry are removed. Fresh water is added with the aid of a fine-rosed watering can. The water must be about the same temperature as the fry tank and of course must not be fresh tap water. Either allow it to stand for a day or so or take some from a healthy pond, no intruders are included.

A watch can be made at nights with a strong torch to make sure that there are no visible pests in the fry tank. One of the finest foods for the fry, to follow the liquid food, is finely mashed white worm. If this is not available some small earth worms or well washed Tubifex can be mashed up. Only a little of such food should be given and it is a good plan to give this through a fine sieve, such as a silk stocking. Anything which fails to go through can be fed to larger fish. Do not be in a hurry to use dried foods. I consider that any form of live food well mashed up is better for a time. Once the fry have got to about a month old they should be much easier to feed and can then take various forms of dried foods. I find the flaked dried foods are very easy to reduce to a fine powder with the aid of worm shredders and this fine food will float on the surface for a time and it can then be seen if the fry are on the feed. One must have patience to watch for this as the fry will disappear at once when anyone approaches the tank, but if one keeps quite still they soon come and start feeding.

The feeding now follows a regular pattern by increasing the size and type of food. One danger can arise and that is when the fry are eating well one is inclined to over-feed and it is then that any un eaten food can so pollute the water that the fry go off their food and the water turns too foul for them and deaths occur. Just one day of over-feeding can be enough to start a bad run of trouble. Always try to keep the youngsters searching for food.

Pests and diseases

The feeding will be fairly simple and follow the usual pattern for goldfish feeding. As the fish grow so the food can be increased in size but be very careful to give only food of a size which the fry can take. It will be found that some of them grow at a faster rate than others and if a few get much larger than the others this may lead to trouble. It is possible for young fish to eat or try to eat their younger brothers and sisters. If any are seen to be getting much larger than others it is better to remove them and keep the sizes apart. With fancy goldfish it may be found that it is not always the largest fish which make the best specimens.

The most important part of rearing the fry will be to make sure that as they grow they have plenty of swimming space. Not only will this ensure that they continue to thrive but it will also mean that they stay healthy and are not as likely to be attacked by pests and diseases. Like most other animals they have a natural means of self protection from disease as long as they keep in good condition. Over-crowded fry will soon become prey to any troubles which may be around.

Many breeders rely a great deal on feeding with water fleas (*Daphnia*). Whilst I would not for one moment say that they are not a good food and are usually taken eagerly by all fry, I have found that it is possible to introduce much trouble in the form of pests and diseases by using such food. I have not used any *Daphnia* for many years since I had a bout of Flukes among my fry. This may not have been introduced with the *Daphnia* but I have never had the slightest trouble with fry since I decided to refrain from using any live foods whatever from natural waters. I consider that it would be almost impossible to collect *Daphnia* from an outside or natural pond without also getting many unwanted pests in the catch. If a quantity of water from such a pond could be placed under a microscope I would be very surprised indeed if it did not show all kinds of pests in the form of larvae or young of various creatures. The same objection arises against mosquito larvae and *Tubifex*. It is quite possible, and I state safer, to rear goldfish fry without using either of the live foods I have mentioned above. The live foods which I consider safe are: white worms (*Enchytraea*), micro worms and Grindal worms, earth worms (small ones for young fish), and maggots. It will be noted that none of these live in water and so cannot introduce any water pests such as flukes, larvae or nauplii of fish lice, anchor worm, white spot or any of the many pests which live or spend part of their life in water.

One of the first troubles which may attack very small fry is a kind of fungus which forms on the gills. This is evident as fine, cotton wool-like substance protruding from the edges of the gill plates. I think that this may be encouraged to develop if the feeding with dried food has been over-done. Once the fry appear to be feeding well it is very easy to give that little bit extra and which remains un eaten. This soon pollutes the water and in warm water such as is often used for rearing fry, the danger of pollution is increased. Once this trouble is seen it must be treated as soon as possible. A slight introduction of methylene blue, a couple of drops of 5 per cent solution to a gallon of water may effect a cure. I had this trouble once years ago and cured the fish with the addition of sea salt. This was a weak solution and I feared that it might kill the fry, but it did not do so and cured the fry of the complaint. It appears that even small fish can withstand a little salt in the water but it must not be added too strongly, especially in the first instance. A very gradual introduction is apparently safe.

As fish get to a month old or more they can be attacked by flukes. There are two main ones, *Gyrodactylus* and

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The Ceylonese fire barb

by H. E. R. Thompson

THIS beautiful little fish from Ceylon is not truly a barb but one of the *Rasbora* species and one which, to my regret, is not very often seen. A probable reason for this being that to see this lovely fish in its best adornment, the correct conditions must be provided, but when on display in a dealers haze tank it would be passed over as a colourless and uninteresting subject: given the proper conditions and it would appear to the uninitiated to be a different fish entirely. To bring out the best in *Rasbora heteromorpha*, to give this fish its scientific title, a well set-up tank with a background of fairly dense plant thickets is essential: soft, a very clean, slightly acid water, preferably peat filtered at a temperature in the upper 70°F will complete the basic requirements. Given these conditions and our "Fire Barb" lives up to its name, for it appears to glow with a warm flame coloration over its entire body and fins, the back being overcast with an oxidized blue sheen. A very colourful fish and one that catches the eye as it swims gracefully at about mid-water level. Another attractive feature is the very large dark eyes.

The maximum length is 1½ in. and the body shape is similar to its close relative, the Harlequin (*Rasbora heteromorpha*) these two species being less elongate than most other *Rasboras* known to aquarists.

The Fire Barb will swim with the Harlequin and the two species shoaling together makes a very colourful display indeed, the delicate shades of the former contrasting with the dark heavier markings of the latter. A mixed shoal of eight to ten makes a pleasing spectacle in a suitably planted tank.

Feeding is simple. All the usual good quality prepared foods are readily accepted and all live foods are taken with relish, but these must be of a suitable size and it is advisable to chop worms before feeding. Given good food and the aforementioned conditions the Fire *Rasbora* (as it is sometimes referred to) proves to be a very hardy little fish, seeming so all very little and with a fairly long life span; but, to add a word of warning, it is very prone to white spot (*Lichtyophthirius*). It is my experience that this fish contracts white spot disease quicker than any other species, so to would-be owners of this little beauty I would say make very sure that any new additions to aquariums housing them are well and truly quarantined. A preventative treatment with PS type 1 tablets is to be recommended when obtaining these *Rasboras* or any other species which are to be introduced to tanks containing them. This could save considerable inconvenience and probably fish life.

When it comes to breeding the Fire Barb is classed with the "difficult" ones, as indeed are several of the *Rasbora* group, i.e., *Heteromorpha*, *Maculata*, *Paniculifera*, and those that have been bred have usually been by accident and the event cannot be repeated. It is quite likely that these *Rasboras* are community spawners and water with a pH reading as low as 5.5 is necessary. The waters in the

Malayan region where the Harlequin and other *Rasboras* come from read at about this scale so it is probable that the same water would suit *heteromorpha*. It would be interesting to hear if any amateurs have succeeded in breeding this fish. The choice of a breeding pair is very important and self mated pairs are more likely to give results. The males are vigorous drivers so plenty of "elbow room" is essential. These fish are spawn robbers so removal of potential parents as soon after spawning as possible will provide for a bigger hatching. The eggs are deposited in plant thickets and have very little adhesive power: hatching takes place in 24-30 hours and the young are very small, requiring rotifers and nauplii at first; growth is fairly rapid and larger foods are soon taken.

To sum up, the Fire Barb is a very desirable occupant for the smaller community and is especially recommended to be kept in company with Harlequins. It is peaceful, active and hardy, easily cared for and of elegant beauty.

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Pests and diseases

Dactylogyrus. The fish become very restless and rub themselves on rocks or the side of the tank. They go off their food and mouth at the surface. The fins fold up and the fishes gradually become emaciated. Later stages show blood streaks on the body and the fishes then soon die. I have found that the pests can be killed by an immersion in a solution of Dettol. This must be a very weak one, only about a quarter teaspoon to a gallon of water. Even then the fish must not be left in for more than a few minutes. Watch all the time and remove the fish to fresh water immediately if it turns over. It will soon recover and it may not be necessary to repeat the treatment, but if any pests survive, another immersion can be given.

The many parasites and pests which can attack fry are those mentioned above but it is still possible for some of them to appear in the tanks. These will mostly be the larvae from eggs laid by dragonflies and water beetles. Both of these can eat many fry and if any are suspected the tank should be emptied, collecting the fry at the same time, and a fresh clear tank provided. Fry tanks should be inspected every night with a strong torch. It is surprising how many pests may be seen at such times which are not in evidence during the daytime.

Make sure that as the fry grow they are given more space as nothing is likely to encourage trouble more than if they are kept in crowded conditions. The cleanliness of the tank must also be a major task as pure water is less likely to be the cause of such troubles as forms of fungus than a foul tank. To avoid trouble make sure that all the necessary conditions are provided and then there should be little chance of losses from pests and diseases.

Taming of a shrew

by Terry Jennings

Illustration by Judy Jennings



FEW aquatic mammals are suitable to keep in the ordinary home. One notable exception is the water shrew, a courageous and aggressive little animal that bustles about by clear streams and especially near watercress beds.

The water shrew can be seen in these places chasing the whirligig beetles and water-gnats on the surface, or diving to the bottom for caddis-worms and their larvae. Its haunts may often be detected by the little heaps of caddis cases on the bank that have been brought ashore and emptied of their living contents. Another good way to locate a water shrew colony is to quietly follow the stream or river bank and listen for their squeaking and twittering.

To some extent "water shrews" is a misnomer, for quite often these animals are found miles from the nearest water. Their only adaptations to an aquatic life are a keel of hairs on the tail, which converts it into a rudder, and fringes of hairs on the toes, making the feet more paddlelike. Like penguins, water shrews are rather awkward and ungainly on dry land but they are transformed into objects of elegance and grace on entering the water. Their black, glossy coats are reminiscent of those of moles, but the white colour of their underside, as well as the round, streamlined contours of their bodies, provide another striking similarity to penguins.

Like its more terrestrial relatives, the water shrew is extremely active, hunting both by night and day, and only pausing for short rests. It plays in the stream, running after its companions through and over the half-submerged branches and roots, diving and swimming under water with air-bubbles clinging like silver jewels to the short, dark

pelt. The shrew paddles across the surface, almost running on the water, but any sudden noise or movement causes it to vanish with a plop. At times the animal walks along the bed of the stream, using its long, sensitive snout for turning over pebbles or delving in the mud for invertebrate food. Although it may stay submerged for quite a long time, it never gets wet.

During the spring and summer, and especially in May and June, water shrews can sometimes be seen collecting bedding and carrying it under water towards their nest. This is frequently in a burrow in the bank, and far inside the female lines a chamber with moss and fine roots, or weaves a round nest of grass and leaves where she brings forth four to eight minute, blind and naked young. The first litter is followed with almost indecent haste by another of about the same size.

This rather long preamble is intended not only to describe some of the ways of water shrews but also to emphasize how extremely active these animals are during their life span of little more than a year. Their constant activity is only maintained by enormous quantities of food for, like its relative the mole, a shrew will die if deprived of food for more than two or three hours. The water shrew is,

therefore, an exacting charge, but to anyone able and willing to devote the necessary attention to it, this animal is one of the most gratifying, charming and interesting objects of care.

Obtaining shrews should not present too many difficulties. In favourable haunts they can be trapped with comparative ease in a Longworth or some similar "catch-alive" trap using fish as a bait. The trap should be as large as possible and offer food and dry bedding for hiding and warming-up. It is advisable to visit the traps as often as possible and to remove trapped shrews with the utmost expedition to their permanent quarters. For those with sufficient patience and dexterity, it is possible to net shrews by waiting for them to appear in a suitable locality or even to catch them with the hand as they run along the bank.

Another, and perhaps better, although troublesome, way of procuring water shrews is to hand-rear the young. It is best to take the young from the nest as late as possible and, to begin with, they should be fed, a little and often, on finely minced fresh-water fishes, mixed to a soupy consistency with milk and the squeezed-out insides of mealworms.

Adults are fed on live, or freshly killed, small fishes, frogs and tadpoles. Insects and earthworms are eaten greedily, so too are water shrimps, snails and mealworms. This diet can be supplemented, but not replaced, by raw heart cut into thin slivers and freely mixed with egg yolk, and also by rolled oats and certain proprietary tinned dog

foods. Newly-caught shrews eat more than their own weight of food daily, and although this appetite diminishes, a surplus of food must always be available.

The cage for the water shrews should be as large as possible, the larger the better, so as to permit the animals plenty of exercise. Allow at least one square foot of floor space to each animal to prevent fighting and, if there is room, provide a separate nest-box for each shrew.

My two shrews were caught with a net. At first they were kept in a large terrarium containing a deep layer of soil into which was sunk a small aquarium, 10 in. \times 7 in. \times 7 in. A few rocks and pieces of turf were also introduced to provide cover, and two small nest-boxes filled with dry hay. A further item of furnishing was a sheet of wood about 9 in. square, supported at two ends by lengths of wood 2 in. in diameter and with dry soil packed not too tightly underneath. This arrangement helps the shrew to dry its fur after swimming, and when the soil is seen to be wet and sodden by the shrew's burrowing it should be replaced.

This cage was very satisfactory in many ways but it did not allow me to watch the shrews' underwater activities as closely as I would have wished. Later I transferred the animals to an aquarium three feet in length by about two feet wide. In it was placed a table which took up half of the area of the tank. It was weighted down so that it would not float, and then the tank was filled so that the



Illustration
by
Bill Simms

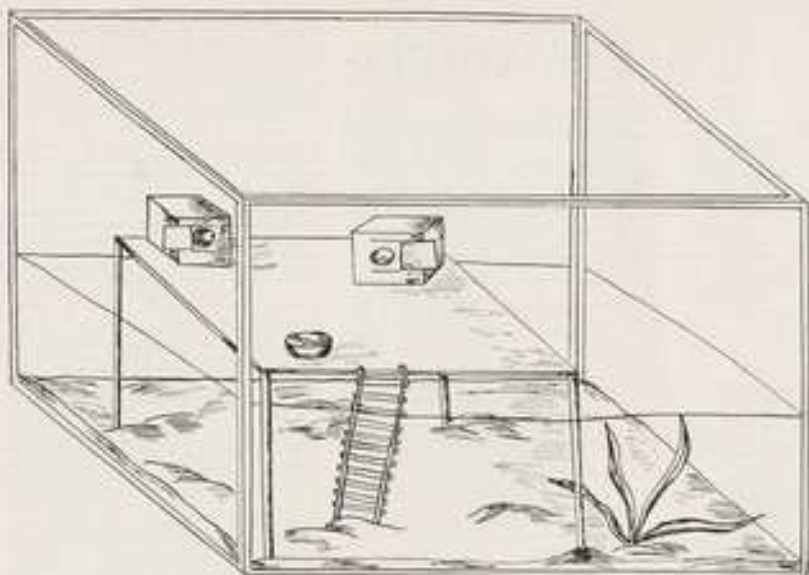


Illustration by
Judy Jennings

A tank set-up ready
for water shrews

water was nearly level with the top of the table. The nest-boxes, each with a sliding shutter over its small entrance hole, were filled with dry hay and fastened on to the table together with a small tin lid to act as a receptacle for food. The idea of the sliding door on each nest-box was to enable the animals to be shut in while routine maintenance of the tank was being carried out. The other item placed on the table was the sheet of glass with dry soil under it, from the original cage.

In all diving animals the loss of the waterproof quality of the skin covering is one of the chief dangers to their well-being. Once lost this water repellent quality is very hard to regain. One frequent cause for the destruction of the water-repellent surface in captive water shrews is dirt. A slight soiling of the fur will destroy the waterproofing, even when the damage is restricted to a very small patch. Fool water is also detrimental. Unfortunately, the enormous quantity of food consumed by the water shrews leads to large amounts of excrement being produced. Frequent change of water is necessary if it is not to become a stinking brew and the animals sick and mangy-looking. The ideal is to have a permanent flow of water through the tank. Even so, regular attention must still be paid to the removal of solid detritus. The nesting material should always be kept clean and dry for the same reason.

Rest assured that so long as the shrew's fur is absolutely dry when it swims under water, without any dark strand of wet hair showing upon the water-repelling surface, nothing whatsoever is amiss.

A water shrew will bite like a tiger when alarmed, although its teeth can only pierce very tender skin. Woolen gloves provide it with a good surface to grip and worry

during initial handling. My two water shrews quickly became quite tame and fearless, and took food from my fingers within an hour of my getting them home. They never tried to bite once they had got over their initial fright but nestled down in my hand like tame mice. There is something very gratifying about having achieved what we are led proverbially to believe is very difficult—the taming of the shrew!

Book review

The Aquarium and The Vivarium and Terrarium

THESE attractive books are both intended to stimulate active interest in their subject matter among young naturalists. (Older readers please note, however, that these are not so aimed at children that they are not equally acceptable to adults who are on the threshold of vivarium keeping). Illustrated with well executed drawings by J. S. Adams, the style of the author's writing coupled with her practical approach and clear, step-by-step instructions, lead the tyro effortlessly through the fundamental stages of aquarium and vivarium maintenance respectively. One might question the occasional use of outmoded terminology in the case of some species described but this is not likely to upset the young aquarist thirsting for, and finding, the practical answers to his problems.

AT the annual meeting of the **Leamwit Major A.S.**, the following were elected to office: Chairman, Mr. W. D. Soughart; Vice-Chairman, K. Patman; Secretary and Treasurer, R. Wigg; Librarian, Mrs. Pearce. K. Patman kept the members interested at the August meeting with a talk on his method used when setting up a tank for tropical marines. After being set up for three months everything was progressing satisfactorily. He had just set up his second tank for a new stock which he had just received. A table show was the main interest for the September meeting. The Stumpet Cup for the Best Fish was won by A. Rogers, with a Platy Varianus. Breeders Egglayers, Mr. A. Robertson, Breeders Livebearers, I and 2, H. Wigg, Single Fish A/V Livebearers, I, A. Rogers, and 3, A. Robertson, A/V Egglayers, I, J. Sanders; 2, A. Robertson; 3, A. Rogers.

THE first Open Show of **Harlow A.S.** was held as part of the Town Show. Entries were received from nine clubs and a state and tape exhibition. The results were as follows: Best Fish in Show, M. Dunton (Harlow) Albino Tiger Barb. Harlow Challenge Cup for Club winning most points, Harlow A.S. F.R.A.S. M. Patman (Harlow). Furbished Aquariums: 1, Tottenham A.S.; 2, Tottenham A.S.; 3, Walthamstow A.S.; 4, Harlow A.S. A.V. Guppy: 1, F. Daley (Harlow); 2, D. Durrant (Thursock); 3, Mrs. B. Burton (Harlow); 4, M. Holmes (Mid Herts). A.V. Fighter: 1, T. D. Smith (Hendon); 2 and 3, D. Durrant (Thursock); 4, J. Dougan (Harlow). A.V. Toothbrush: 1, R. Pearson (Fresnoe); 2, R. Gier (Harlow); 3 and 4, G. Souren (Harlow). A.O.V. Livebearers: 1 and 2, M. Smith (Walthamstow); 3, P. Wenzel (Harlow); 4, A. Dennis (Harlow). A.V. Dams, Fishery: W.C.M.M. 1, J. and 2, M. Patman (Harlow); 3, S. Morgan (Harlow) A.O.V. (Labyrinth); 1, L. Lammert (Harlow); 2, E. Nicol (Thursock); 3, A. Day, Inc. (Harlow); 4, R. Wain (Harlow). A.V. Characin: 1, R. Kettle (Harlow); 2, P. Burton (Harlow); 3, M. Smith (Walthamstow); 4, P. Burton (Harlow); 1, H. Patman (Harlow); 2, R. Kettle (Harlow); 3, R. Kettle; 4, M. Patman (Harlow). A.O.V. Goldfish: 1, P. Burton (Harlow); 2, D. Durrant (Thursock); 3, F. Williams (Tottenham); 4, E. Nicol (Thursock). A.V. Cichlid: 1, E. Gee (Witham); 2, P. Burton (Harlow); 3, R. Kettle (Harlow); 4, J. Durrant (Harlow). A.O.V. Tropical: 1, E. Gee (Witham); 2 and 3, T. D. Smith (Hendon); 4, Mr. Holmes (Mid Herts).

THE results of the first M.A.L. League show held at Rugby were as follows: Cichlids: 1, A. L. Trotman (Atherstone); 2, E. J. Sheehy (Coventry); 3, T. H. Coombes (Bedworth). Anabantids: 1, Mr. & Mrs. D. J. Dutton (Bedworth); 2, D. Green (Rugby); 3, A. L. Trotman (Atherstone). Breeders Egglayers: 1, H. Fox (Rugby); 2, A. L. Trotman (Atherstone); 3, Grant (Coventry). The Best Fish in the Show was won by Mr. B. Fox of Rugby. The points up to date: Atherstone 18; Bedworth 14; Coventry 12; Leamington 10; Northampton 10; Rugby 16.

THE main item in the **International Marine Society** programme seems to be displays and talks on the Open Show circuit. Combined with the extremely successful displays at both the National Open Show run by the Nottingham A.S. and the Newport Open Show in September, I.M.S.S. members are looked to give no less than seven talks in addition to the five already given in the "exposure only" season series.

An I.M.S.S. outing to Oringpleas in Surrey recently was a great success, although many members were unable to attend due to it being the holiday season. A total of twenty-one fishes were captured, rarer species including Sand Scaevola (*Atherina probreter*) and Black gobies (*Gobius niger*), besides two unidentified

young Weasels. Another informal visit by officers of the Society of Showbusiness in Essex resulted in a catch of well over 100 fishes within two or three hours. These contained mainly of *Gobius niger*.

Answers wishing further information on any of the I.M.S.S. services, attached or ordinary membership, should write to the Membership Secretary, Keith Martin, 458 Oxford Road, Swindon, Wilt., or the General Secretary, Mr. T. R. Hall, 23 Confield Gardens, N.W.6.

THE Show results of the **Bethnal Green A.S.** were as follows: Intra-Club Furbished Aquariums: 1, Tottenham and District; 2, Walthamstow A.S.; 3, Bethnal Green A.S.; 4, Walthamstow A.S. Breeders Tropical Egglayers: 1, B. G. Dunn, Blue Galera; 2, J. C. Wheeler, Aph. Sophia Mate; 3, F. H. Vickar, Empress Tern; 4, L. Bromley, Anglis. Breeders Tropical Livebearers: 1, A. Jamieson, Red-eyed Red Swordtail; 2, D. Durrant, Black Saffron Mollie; 3, L. R. Smith, Yellow Guppies; 4, E. Nichols, Red Platy. A.V. Fighters: 1, D. Durrant; 2 and 3, D. Durrant; 4, A. E. Soren, A.V. Mollie; 1, F. E. T. Smith, Villains; 2, M. Smith, Liberator Mollie; 3, A. W. Collins, Villains; 4, W. Barker, Saffron. A.V. Barb: 1, T. D. Smith, Choti; 2, B. G. Dunn, Cherry; 3, R. Naylor, Roy; 4, A. J. Day, Roy. A.V. Platy: 1, F. E. T. Smith, Red Platy; 2, T. Gilman, Red Platy; 3, J. Palmer, Black Platy; 4, G. D. Greenhall, Marigold. A.V. Guppy: 1, D. Greenhall, Marigold; 2, E. H. Burns, Vellid; 3, G. B. Greenhall, Vellid; 4, W. Wren, Vellid. A.V. Characin: 1, P. Wilson, Piranha; 2, F. Wilson, Leposoma; 3, W. Barker, Red Piranha; 4, R. Knock, Bleeding Heart Tetra. A.V. Swordtail: 1, G. Aylard, Albino; 2, R. Knock, Black; 3, J. Harlebury, Black Parula; 4, A. Black, 1, Harlebury, Black Parula; 4, A. Black, 2, Harlebury, Black Parula; 4, A. Black, 3, Harlebury, Black Parula; 4, A. Black, 4, Harlebury, Black Parula; 4, A. Black, 5, Harlebury, Black Parula; 4, A. Black, 6, Harlebury, Black Parula; 4, A. Black, 7, Harlebury, Black Parula; 4, A. Black, 8, Harlebury, Black Parula; 4, A. Black, 9, Harlebury, Black Parula; 4, A. Black, 10, Harlebury, Black Parula; 4, A. Black, 11, Harlebury, Black Parula; 4, A. Black, 12, Harlebury, Black Parula; 4, A. Black, 13, Harlebury, Black Parula; 4, A. Black, 14, Harlebury, Black Parula; 4, A. Black, 15, Harlebury, Black Parula; 4, A. Black, 16, Harlebury, Black Parula; 4, A. Black, 17, Harlebury, Black Parula; 4, A. 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Society and a committee was elected. The committee had its first meeting on 22nd September and delegated the following positions: P. Bennett, Secretary; J. Beard, Chairman; A. Butler, Treasurer. New members can be assured of a warm welcome and should contact P. Bennett, Secretary, 29 The Crescent, Brambridge, Eastleigh, Hants.

A LARGE number of members attended the monthly show of **Keighley and District A.S.** when the entertainment for the evening was a very interesting lecture on "Fish Diseases" given by Mr. Haldeman. The usual Table Show was held, with the following results: Specified 1 and 2, A. B. White; 3 and 4, H. M. Smith; A.O.V. 1 and 2, A. B. White; 3 H. M. Smith; 4, J. Melvin; Novice A.O.V. 1, T. Cammisa; 2, P. Doreley; 3, T. Cammisa; 4, N. Fyfe; Junior A.O.V. 1, Mavor A. Smith; 2, Mavor A. White; 3 and 4, Mavor A. Smith.

AT the September meeting of the **Penrith and District A.S.** the meeting was thrown open to a general discussion among the members while the visiting judge and lecturer P. Reynolds judged the Table Show, the results being as follows: Characins: 1, D. Hodgkins; 2, Mover; Piper and Goodall; 3, J. Thompson. Carps and Minnows: 1, S. Town; 2, Mrs. B. Cohen; 3, D. Cohen. Mr. Reynolds then gave a short talk on Society life and showing fishes. A trophy was donated to the Society by Mr. J. Thompson to be used as a "Best exhibit of the month award" the first winner being Mr. Hodgkins with a Red-Fin Tetra.

THE **Bournemouth Aquarist Club** recently returned to the open show arena, and held a one day show at their new meeting place—Kinson Community Centre, Bournemouth. This was the first Open Show for many years, and proved a most excellent success. The show was very well supported with nearly 400 entries being brought. The show proved such a huge success that it is hoped to make this an annual event. The following were the results: Guppy, Male: 1 and 3, T. J. Croacher, Brighton A.S.; 2, B. Coombes, Bournemouth A.S.; 4, F. Brown, Bristol A.S. Guppy, Female: 1, B. Coombes, Bournemouth A.S.; 2, J. Scott-Morgan, Bournemouth A.S.; 3, T. Croacher, Brighton A.S.; 4, F. Brown, Bristol A.S. Swordtails: 1, B. J. Cammisa, Brighton A.S.; 2, S. A. Garcia, Bournemouth A.S.; 3, R. Hemming, Bristol Tropical A.S.; 4, R. Hatcher, Southampton A.S. Platin: 1, U. W. Easton, Weymouth A.S.; 2, R. J. Lawton, Bristol Tropical A.S.; 3, G. Gillard, Yeovil A.S.; 4, A. Nicholas, Yeovil A.S. Mollies: 1, D. V. Jones, Salisbury A.S.; 2, A. Nicholas, Yeovil A.S.; 3, D. W. Ellis, Kingston A.S.; 4, G. Gillard, Yeovil A.S. Characins: 1, G. Gillard, Yeovil A.S.; 2, J. Burt Morgan, Bournemouth A.S.; 3, R. J. Amisage, Portsmouth A.S.; 4, A. G. Cox, Weymouth. Dwarf Cichlids: 1, F. Harrison, Weymouth A.S.; 2 and 4, L. S. Pullington, Gosport A.S.; 3, B. Watkins, Bournemouth A.S. Cichlids: 1 and 4, E. J. Cammisa, Brighton A.S.; 2, I. Anderson, Bournemouth A.S.; 3, A. D. Coombes, Salisbury A.S. Barb: 1, N. Stainer, Yeovil A.S.; 2, F. Brown, Bristol A.S.; 3, Mrs. D. King, Bath A.S.; 4, J. V. Jeffery, Bournemouth A.S. Egg laying Tooth-Carps: 1, D. W. Ellis, Kingston A.S.; 2 and 3, H. J. Amisage, Portsmouth A.S.; 4, H. Towell, Kingston A.S. Fishers: 1, J. Scott Morgan, Bournemouth A.S.; 2 and 4, Mrs. D. King, Bath A.S.; 3, N. Stainer, Yeovil A.S. A.O.V. Labrinths: 1, I. Goddard, Salisbury A.S.; 2, S. A. Garcia, Bournemouth A.S.; 3, B. J. Lawton, Bristol Tropical A.S.; 4, F. Brown, Bristol Tropical A.S.; 5, D. Jones-Roberts and Minnows: 1, D. W. Ellis, Kingston A.S.; 2, F. Brown, Bristol A.S.; 3, A. G. Cox, Weymouth A.S.; 4, G. Marks, Portsmouth A.S. Catfish and Loach: 1, J. Melvin, Poole A.S.; 2, F. Brown, Bristol A.S.; 3, K. J. Clouse, Gosport A.S.; 4, P. Lloyd-Worth, A.O.V. Tropical: R. Hemming, Bristol Tropical A.S.; 2, N. H. Wright, Yeovil A.S.; 3, D. W. Ellis, Kingston A.S.; 4, E. R. Selby, Poole A.S. Bristles Egg-layers: 1, T. H. Hutton, Weymouth A.S.; 2, Mrs. D. King,

Bath A.S.; 3, H. Earl, Bournemouth A.S.; 4, E. J. Mullen, Poole A.S.; Bristles Livebearers: 1, B. J. Lawton, Bristol Tropical A.S.; 2, F. Brown, Bristol Tropical A.S.; 3, B. J. Lawton, Kingston A.S.; 4, J. Scott-Morgan, Bournemouth A.S. Brokers Goldfish and Guppies: 1, J. V. Jeffery, Bournemouth A.S.; 2 and 3, V. P. Voysey, unattached; 4, D. V. Jones, Salisbury A.S. A.V. Strubankins: 1, S. A. Garcia, Bournemouth A.S.; 2, Mrs. W. Voysey, unattached; 3 and 4, P. Puckney, Bournemouth A.S. Twinstails: M. Gardner, Bournemouth A.S.; 2, Mrs. W. Voysey, unattached; 3, J. T. Watson, Gosport A.S. A.V. Strubankins: 1, S. A. Garcia, Bournemouth A.S.; 2, Mrs. W. Voysey, unattached; 3, V. B. Hunt, Portsmouth A.S.; 4, S. Gillard, Bournemouth A.S. Any reader interested are invited to the Meeting, held on the 1st Monday of each month at 7.30 p.m. at Kinson Community Centre, Pelham Park, Kinson, Bournemouth.

Hiddeburgh (Bradford). Toothcarps: 1, Mr. Cranwick (Poole); 2, Mr. A. Wood (Bristol); 3, Mr. R. Shepherd (Bradford). A.O.V.: 1, Mr. P. Moorhouse (Bradford); 2, Mr. G. Holmes (Bradford); 3, Mr. L. Taylor (Bradford). Brokers (Giv): 1, Mr. & Mrs. Dennis (Workop); 2, Mr. Tunney (Stokebridge); 3, Mr. J. Hodgkinson (Bradford). Brokers (egg): 1, Mr. Dinkin (Workop); 2 and 3, Mr. A. Beasley (Dram). Pair (live): 1, Mr. & Mrs. Dennis (Workop); 2, Mr. D. Parkin (Bradford); 3, Mr. J. Whitley (Ayrborough). Pair (egg): 1, Mr. W. Bony (Bradford); 2, Mr. C. Bony (Bradford); 3, Mr. P. Bony (Bradford). Goldwater: 1 and 2, Mrs. G. Holmes (Bradford); 3, Mrs. H. Fletcher (Bradford). Parrotfish: 1, Mrs. Barry (Swillington); 2, Mr. Shields (Bradford); 3, Mr. P. Barry (Bradford).

A CHANGE of address has been notified by the secretary of the **Worcester A.S.**, the new particulars being Mr. L. Corcoran, 13 Cottage Lane, Marlbrook, Bromsgrove, Wores. The club's new headquarters are at the Congregational Church, Hall, Angel Place, Worcester, and a cordial invitation is extended to all who may care to come along.

A NUMBER of interesting articles are featured in the **York and District A.S.** monthly journal for September. This society meets on the second Tuesday of the month at the Wood-park Hotel, Southow, York, and the secretary is Mr. G. B. Hawksley, 65 Beaconsfield Street, Acomb, York.

THE **Merseyside A.S.** Open Show results were as follows: Guppies: 1, H. Jones; 2, E. Murgatroyd; 3, J. Dougherty. Swords and Plures: 1 and 2, W. Kelly; 3, K. Parkes. Mollies: 1, E. Murgatroyd; 2, W. Smith; 3, K. Parkes. Catfish: 1, R. Moorcroft; 2, F. Mullis; 3, J. Robinson. Fishers: 1, W. Kelly; 2 and 3, R. Moorcroft. Gouramis: 1, J. Robinson; 2 and 3, F. Mullis. Barb: 1 and 3, J. Robinson; 2, N. Peterson. Large Characins: 1, Mrs. V. Parkes; 2, W. Smith; 3, J. Dougherty. Small Characins: 1, F. Mullis; 2, S. Tickle; 3, J. Dougherty. Large Cichlids: 1, R. Moorcroft; 2, S. Tickle; 3, K. Parkes. Danos: 1, R. Moorcroft; 2, K. Parkes. Dwarf Cichlids: 1 and 2, W. Smith; Pair: 1 and 2, R. Moorcroft; 3, H. Jones. A.O.V.: 1, J. Robinson; 2, F. Mullis; 3, J. Dougherty. Juvenis: 1, Mavor N. Kibby.

THE results of the fourth Open Show of the **Nottingham & District A.S.** were as follows: Common Goldfish: 1, B. W. Foreman; 2 and 3, D. Wragg. London Shubankins: 1, J. Amott; 2, B. W. Foreman; 3, Mr. & Mrs. C. Hill. Bristol Shubankins: 1, Mr. Beard. Nodded Platies: 1 and 2, H. Tibbery. Calfes Platies: 1 and 2, H. Tibbery. Blue coldwater fish, Breamid Com: 1, F. W. Snywell. Black Moor: 1, 2 and 3, H. Tibbery. Ovada: 1 and 2, H. Tibbery; 3, Mr. & Mrs. C. Hill. Orfe: 1, B. W. Foreman; 2, Mavor Ian Kelly. Baud: 1, B. W. Foreman; 2, Mr. & Mrs. C. Hill; 3, J. Amott. Tench: 1, Mr. & Mrs. C. Hill; 2, B. W. Foreman; A.O.S. Goldwater: 1 and 2, H. Tibbery; 3, Mr. & Mrs. C. Hill. Brokers Coldwater: 1 and 2, Mr. B. W. Foreman; 3, Mr. Manner. Betta Splendens, male: 1, W. H. Selby; 2, Mrs. S. D. Underwood; 3, J. and H. Dennis. Betta Splendens, female: 1, J. and H. Dennis; 2, Mrs. S. D. Underwood. Three topped gourami: 1, Mr. Mottrell; 2 and 3, E. N. Gee. Dwarf Gourami: 1, J. and H. Dennis; 2 and 3, Mrs. C. M. Beard. Lace Gourami: 1, G. Wainless; 2, D. Wragg; 3, J. and H. Dennis. Blue Gourami: 1, Mrs. S. D. Underwood; 2, Miss A. Hill; 3, Mrs. S. D. Underwood. Tiger Gourami, A.O.S.: 1 and 3, J. and H. Dennis; 2, W. Parkes. A.O.S. Anabantid: 1, Mr. Mottrell; 2, G. Hodgkinson; 3, P. Underwood. Ruby Barb: 1, P. Underwood. Cinnamon Barb: 1, J. Allen; 2, G. H. Colton; 3, A. Benson. Nigger Barb: 1, Mrs. J. K. Smith; 2 and 3, P. Smead. Chequer Barb: 1, G. Bullock; 2, W. Taylor; 3, J. and H. Dennis. Tiger Barb: 1 and 3, J. and H. Dennis; 2, G. Hodgkinson. Cherry Barb: 1, J. and H. Dennis; 2, Trevor Pinner; 3, A. Beasley. Barbis, under 3": 1, Mrs. J. K. Smith; 2 and 3, H. G. Colton. Barbis, over 3":



The Aquarists' Badge

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

To obtain your badge send a postal order for 3s. 6d. to *The Aquarist*, The Batts, Half Acre, Boreford, Middlesex, and please specify which type of fitting you require.

THE new secretary of the **Warrington A.S.**, Mr. Roy Teach wishes to thank all fellow aquarists for the support, help and friendship given to him during his term of office, and to wish his successor Mr. Howard Bennett will receive the same co-operation to enable the continuance of the Club's ambitious plans for the future.

THE results of the **Bradford A.S.** open table show were as follows: Livebearers: 1, Mr. Parkin (Bradford); Mr. Tinson (Ayrborough); 3, Mr. & Mrs. Dennis (Workop). Barb: 1, Mr. & Mrs. Firth (Bradford); 2, Mrs. Barry (Swillington); 3, Mr. & Mrs. Dennis (Workop). Characins: 1, Mr. J. Whitley (Ayrborough); 2, Mr. & Mrs. Firth (Bradford); 3, Mrs. Anson (F.G.A.). Carps and Minnows: 1 and 3, Mr. D. Carr (Bradford); 2, Mr. Barrett (Bradford). Anabantids: 1, Mr. Faircliff (Tadcaster); 2, Mr. Barry (Bradford); 3, Mr. Green (Woburn). Fishers: 1, Mr. A. Beasley (Dram); 2, Mr. Whitehead (Tadcaster); 3, Mr. J. Barford (Bradford). Cichlids: 1, Mr. Taylor (Bradford); 2, Mr. Cranwick (Poole); 3, Mr. & Mrs. Dennis (Workop). Catfish and Loach: 1, Mr. & Mrs. Dennis (Workop); 2 and 3, Mr. C.

L. W. Parkin; 2, I. and H. Dennis; 3, G. Warden. Red Tail Shark: 1, J. Warren; 2, E. N. Gee; 3, D. Halford. Black Shark: 1, F. R. Gosnell. Silver Shark: 1, W. Parkin; 2, E. N. Gee. Plaques: 1, J. and H. Dennis; 2, Miss A. Hill; 3, A. Maxwell. Glowlight: 1, Mr. S. Hill; 2, Paul Hodgkinson; 3, J. and H. Dennis. Neon: 1, T. Pitzer; 2, F. Underwood; 3, D. Wong. Ray Tazze: 1, J. and H. Dennis; 2, A. Maxwell; 3, Miss A. Hill. Bleeding Heart: 1, J. and H. Dennis; 2, G. Warden; 3, J. Warren. Serpae Tazze: 1, Mr. & Mrs. C. Hill; 2, Paul Hodgkinson; 3, A. Maxwell. Cardinal: 1, Master P. Strang; 2, F. Underwood. Beacons, etc.: 1, Miss A. Hill (Special Award, stainless steel tank, youngest successful competitor). Black Widow: 1 and 3, E. C. Dennis; 2, K. Bines. Pampin: 1, T. Pitzer; 2, J. and H. Dennis; 3, Paul Hodgkinson. X-Ray: 1, Master P. Cox; 2, Mr. & Mrs. C. Hill. Golden Parrot: 1, G. H. Colton; 2, S. Hill; 3, P. Reynolds. Dwarf Parrot: 1, S. Hill; A.O.S. Characin: 1, W. Parkin; 2, P. Reynolds; 3, E. R. S. Stockdale. Striped Anemone: 1, W. Parkin. Sordidali, male: 1, L. H. Hart; 2, Paul Hodgkinson; 3, W. Parkin. Sordidali, female: 1 and 2, Master D. Beard; 3, Gerald Boothby. Plat (male): 1, J. and H. Dennis; 2, F. Allen. Plat (female): 1 and 3, J. and H. Dennis; 2, S. D. Underwood. Mollus (male): 1, J. and H. Dennis; 2, G. Warden; 3, E. N. Gee. Mollus (female): 1 and H. Dennis; 2, A. Beasley; 3, W. Parkin. Guppy (male): 1 and 2, A. Maxwell; 3, W. Parkin. Guppy (female): 1, W. Parkin; 2, J. and H. Dennis; 3, G. Warden. A.O.S. Livebearer: 1, J. and H. Dennis; 2 and 3, P. Reynolds. White Clouds: 1, F. Underwood; 2, E. R. S. Stockdale; 3, P. Reynolds. Harlequin: 1 and 3, Mrs. J. K. Smith; 2, J. G. Hans. Silurari: 1, F. Gregory; 2, G. Boothby; 3, J. and H. Dennis. A.O.S. Rabbit: 1, G. Hodgkinson; 2, G. Reddish; 3, J. Allen. Ramzini: 1, J. and H. Dennis; 2, P. Reynolds. Cichlid, Severum type: 1, K. Bines; 2, G. Warden; 3, R. F. Oliver. Acari type: 1 and 2, K. Bines; 3, Master A. Maddison. Angui: 1, F. Underwood; 2, G. Boothby; 3, J. and H. Dennis. Jewel Fish: 1, H. P. Warren; 2, Mrs. J. K. Smith; 3, F. W. Seymour. Cichlid under 7": 1, E. N. Gee; 2, W. Taylor; 3, Master D. Beard. Cichlid over 7": 1, W. Taylor; 2, J. H. Hunt; 3, Mr. Beard. Lyristis: 1 and 3, E. R. S. Stockdale; 2, G. H. Colton. Panchat: 1 and 2, A. Wood; 3, J. and H. Dennis. Rivulo: 1, J. and H. Dennis. Top Minnow, A.O.S.: 1, J. H. Colton. Corydora sp.: 1, P. Reynolds; 2, Master A. Maddison; 3, Y. Kelly. Catfish, A.O.S.: 1 and 3, W. Parkin; 2, J. and H. Dennis. Kuhl Lench: 1, Master D. Beard; 2, R. W. Freeman; 3, Master I. Underwood. Gobidae, A.O.S.: 1, G. Hodgkinson; 2, Mrs. I. Bullyment; 3, P. Reynolds. Melanocera sp.: 1 and 3, P. Reynolds; 2, Mrs. J. K. Smith. A.O.S. Tropical Fish: 1, F. S. Moorhouse (Best Fish in Show). Aquarium Cup, System Cup, Junior Gold Fish: 1, Master P. Cox (Junior Shield, best entry by a Junior); 2, P. Reynolds. Pairs, Gourami: 1, D. Halford; 2, E. Price; 3, J. and H. Dennis. Pairs, Barbs: 1, W. Parkin; 2 and 3, J. and H. Dennis. Pairs, Characin: 1, S. Hill; 2, P. S. Monaghan; 3, D. Halford. Pairs, Cichlid: 1, J. and H. Dennis; 2, Mrs. A. M. Hart; 3, Mrs. C. M. Beard. Pairs, Livebearers: 1, J. and H. Dennis; 2, F. Underwood; 3, Mrs. I. Bullyment. Tropical Marine sp.: 1, W. Parkin. Tropical Furnished Tank: 1, D. G. Holland (Prize Trophy Cup); 2, D. G. Holland; 3, P. Bates. Tropical Furnished Aquarium: 1, P. Reynolds (Hugh Water Trophy); 2, K. T. Tiller. Tropical Furnished Aquarium, Marine: 1, A. Harper (C. & M. Hill Trophy, best marine exhibit). Breeders Eggplant: 1, W. Taylor (Aquaria Journal Cup); 2, J. and H. Dennis; 3, G. Bullyment. Breeders Livebearer: 1, J. and H. Dennis; 2, J. G. Hunt; 3, J. Amott.

At the September meeting of the Lanarkshire A.S. Mr. Andrew Wallace of Glasgow gave the club members an interesting lecture accompanied by slides of his favourite pets which were Guppies. At the recent F.S.A.S. Show at Perth, Lanarkshire members were once again in the show. Trophy winners were as follows: O. Stead, Calceolus Cup (Best Catfish); G. Soal, Alexander Cross Trophy (Best Fish in

Show); A. Watt, Strachan Kerr Trophy (Best team in breeders Livebearers "B"); A. Watt, Gosnell Shield (Best team in Breeders Eggplanters "A"); A. Watt, Greenstock Trophy (Best team in Breeders Eggplanters "B"); J. Lovin, Botia Cup (Best Loach); R. Patterson, Kynoch Cup (Best Molly). The Club meets on the first Friday of every month and visitors are assured of a warm welcome from the club members. Further details can be obtained from the Club Secretary, Mr. E. Watson, 8 Westmillard Street, Glasgow, S.1.

THE Open Show results of the Stockport A.S. were as follows: Guppies: 1, E. Price; 2, Miss C. Boothwood; 3, Messrs. Duffy and Beardhill. Mollus: 1, W. Bering; 2, Mr. Woodward; 3, D. Cook. Platies: 1, Mrs. M. Crook; 2, A. Middleton; 3, A. Gardner. Swordtails: 1, W. Bering; 2, Mrs. M. Crook; 3, Mr. Woodward. A.O.V. Livebearer: 1, J. Hillary; 2, H. Pearson; 3, D. Slater. Small Barbs: 1 and 2, D. Thomalla; 3, B. Bewick. Large Barbs: 1 and 2, K. Parkes. Danio etc.: 1, R. Moorcroft; 2, K. Parkes; 3, D. Thomalla. Sharks and Jaws: 1, G. Kershaw; 2, D. P. Johnson; 3, Mr. & Mrs. Charlton; 2, Miss B. Kaye; 3, Mr. Woodward. A.O.V. Small Characin: 1, D. P. Johnson; 2, P. Mulla; 3, Mr. and Mrs. Charlton. A.O.V. Large Characin: 1, D. Thomalla; 2, R. Moorcroft; 3, E. Price. Fishers: 1, Mr. Woodward; 2, B. Bewick. Small Anabantids: 1, E. Price; 2, G. Kershaw; 3, G. Hodgkinson. Large Anabantids: 1 and 3, P. Mulla; 2, H. E. Greenwood. Angel Fish: 1, Stockport Show Team; 2, Mr. Woodward; 3, R. Tomkinson. Dwarf Cichlid: 1, R. Seabright; 2, W. Smith; 3, E. Pritchard. Large cichlids: 1, D. Crook; 2, P. Mulla; 3, Mr. Moorcroft. Corydoras: 1, E. Fletcher; 2, G. Kershaw; 3, R. Brothwood. A.O.V. Catfish: 1, P. Mulla; 2, C. V. Boothwood; 3, E. Price. Loaches: 1, J. Hillary; 2, A. Gardner; 3, G. Hodgkinson. Toothcarps: 1, Mr. and Mrs. Charlton; 2, A. Newell; 3, D. P. Johnson. Breeders Eggplant: 1, 2 and 3, Mr. and Mrs. Charlton. Breeders Livebearers: 1, Messrs. Duffy and Beardhill; 2, J. Hill; 3, W. Bering. A.O.V. Tropical: 1, Stockport Show Team; 2, B. Phillips. Fancy Goldfish: 1, Mr. Ebdon; 2, G. Hammett; 3, W. Bering. A.O.V. Goldfish: 1, Mr. Ebdon; 2, Miss C. Boothwood; 3, J. Hillary. Minnow: 1, Mr. and Mrs. Charlton; 2, Miss M. Kaye; 3, B. Jones. The award for Best Fish in Show was won by Mr. E. Price of Gorton & Openshaw A.S. Stockport A.C. retained their own trophy for the club gaining most points. Merseyside A.S. came second and Gorton & Openshaw A.S. were third.

THE 15th Open Show of the Huddersfield Tropical Fish Society was a great success attracting a total of 318 entries from twenty-six societies. The results were as follows: Swordtails: 1 and 3, P. Ledger (Huddersfield); 2, Mrs. P. McCourt (Leeds). Guppies: 1, R. Preston (Belle Vue); 2, Miss C. Boothwood (Leeds); 3, Mr. Ebdon (Salford). Mollus: 1, Master D. Lacey (Aireborough); 2, J. Whitley (Aireborough); 3, P. Woodward (Blackpool). Platies: 1, S. Seale (Keighley); 2, Master A. Kaye (Huddersfield); 3, K. Lauer (Aireborough). Small Barbs: 1, W. Booth (T.A.B.); 2, J. and H. Dennis (Workop); 3, G. Horton (Mansfield). Large Barbs: 1, D. Crook (Glossop); 2, D. Ledger (Cumbria); 3, B. Wilkinson (Haltwhistle). Characin under 3in.: 1, G. Hammett (Glossop); 2, P. Bone (Huddersfield); 3, J. and H. Dennis (Workop). Characin over 3 in.: 1, Mrs. Aston (P.G.A.); 2, J. Whitley (Aireborough); 3, B. Winger (Mansfield). Carps and Minnows: 1, A. B. White (Keighley); 2, C. Green (Thornhill); 3, Miss B. Kaye (Huddersfield). Sharks and Flying Fish: 1, A. B. White (Keighley); 2, R. Wilkinson (Haltwhistle); 3, P. Barrin (Bradford). Fishers: 1, A. Beasley (Ossett); 2, J. Amott (P.G.A.); 3, Mr. Whinlock (Tadcaster). Anabantids: 1, Mr. Fitzliffe (Tadcaster); 2, C. Green (Thornhill); 3, Mr. Whinlock (Tadcaster). Dwarf Cichlids: 1 and 2, P. Barrin (Bradford); 3, J. Ingram (Glossop). Large Cichlids: 1, D. Crook (Glossop); 2, R. B. Cass (Macclesfield); 3, R. Preston (Belle Vue). Anguils: 1 and 2, Mrs.

Bone (Huddersfield); 3, A. Hudson (Huddersfield). Toothcarps: 1 and 2, A. Beasley (Ossett); 3, Mrs. Bone (Huddersfield). Small Catfish and Loaches: 1, P. Barrin (Bradford); 2, L. McCourt (Glossop); 3, L. Leatham (Mansfield). Large Catfish and Loaches: 1, W. Booth (T.A.B.); 2, J. H. Brown (Mansfield); 3, J. Ingram (Glossop). Breeders Livebearers: 1, J. and H. Dennis (Workop); 2, T. Cunningham (Keighley); 3, W. J. Orson (Salford). Breeders Eggplant: 1, L. McCourt (Glossop); 2 and 3, A. Beasley (Ossett). Pairs Livebearer: 1, Master A. Kaye (Huddersfield); 2, R. Preston (Belle Vue); 3, W. Booth (T.A.B.). Pairs Eggplant: 1, A. B. White (Keighley); 2, H. Dennis (Workop); 3, L. M. Todd (Independents). A.O.V.: 1, G. Hammett (Glossop); 2, J. H. Brown (Mansfield); 3, J. Russell (Huddersfield). Colwester: 1, G. Hammett (Glossop); 2, W. W. Hudson (Salford); 3, Miss E. Berry (Huddersfield). Jewfish: 1, Master C. V. Boothwood; 2, Master A. Kaye (Huddersfield); 3, Master A. Robinson (Huddersfield). Ladies: 1, Mrs. Preston (Belle Vue); 2, Mrs. Barnap (Aireborough); 3, Mrs. Whiteley (Aireborough). Best Fish in Show was won by Mr. G. Hammett (Glossop) with an Ardensia, 45 notably judges: Mr. B. Peggler (Bursley), Mr. F. Cherry (Gillingham).

THE Huddersfield District A.S. have entered the A.S.L.A.S. League which has taken the place of the old A.S.L.A.S. Knockout Competition, and it is hoped that the new idea will enable more clubs to get to know each other, and eliminate the early "wadden death" of societies losing in the early rounds. Each club has to enter in four classes of fishes and the losing team has the first choice of nominations of two of the classes.

One of the other features that the Society has supported is the annual Marathon sponsored by the Fishman German. This year the event was run in aid of the St. John's Ambulance Brigade, and Huddersfield put on first-class exhibition of exotic fish which created very great interest in the public attending the event. The normal fortnightly meetings of the Society continue to be well supported and upwards of 40 members seem to be the rule these days at practically every one. Table Show results held recently were as follows: Any Other Variety Eggplant: 1, Derek Woodward (Aphosammium Australis); 2, Derek Woodward (Aphosammium Australis); 3, Spencer Hill (Elephantus Nasa Fish). Any Variety Catfish and Loach: 1, John Thomas (Corydoras Jullii); 2, John Thomas (Corydoras Jullii); 3, Chris Bance (Corydoras Annum).

At the last meeting, members were entertained with a very interesting talk by Ray Leggett our new American member, on the hobby down- under. New members to the Society are always welcome at the meetings on alternate Wednesdays at the Idleworth Community Centre, or details can be obtained from our Secretary, Mr. Derek Woodward of 18 Ellardine Road, Hemsworth.

THE results of the Ossett A.S. Annual Show were as follows: Furnished Aquarium: 1, H. Penhall (Ossett); 2, K. Ashworth (Ossett); 3, J. E. Shore (Ossett). Anabantids: 1, W. Parkin (T.A.B.); 2, G. Kershaw (Heywood); 3, E. Hill (Heywood). Fishers: 1, T. Sutton (Ossett); 2 and 3, A. Beasley (Ossett). Small Barbs: 1, F. Gregory (Ossett); 2, J. Piggott (Ossett); 3, K. Hill (Heywood). Large Barbs: 1, W. Parkin (T.A.B.); 2, T. Harris (Heywood); 3, T. Patterton (Ossett). Labors and Sharks: 1, G. Kershaw (Heywood); 2, Miss L. D. Shore (Ossett); 3, J. Ogden (T.A.B.). Small Characins: 1, J. E. Shore (Ossett); 2, K. Withraham (Ossett); 3, W. Parkin (T.A.B.). Medium Characins: 1, W. Parkin (T.A.B.); 2, J. E. Shore (Ossett); 3, T. Sutton (Ossett). Large Characins: 1, W. Parkin (T.A.B.). Barbers: 1, G. Kershaw (Heywood); 2, A. E. Mashey (Ossett); 3, F. Gregory (Ossett). Danios: 1, K. Ashworth (Ossett); 2, J. Hayes (Heywood); 3, A. Beasley (Ossett). Dwarf Cichlids: 1, P. Gregory (Ossett); 2, Large Cichlids: 1, W. Taylor (Ossett); 2, Mr. Gardner (Heywood); 3, M. Jones (Valley). Anguils: 1, M. Taylor (Ossett).

2 and 3, E. Eastwood (Oswestry); Loaches: 1, W. Taylor (Gosport); 2, J. Butterworth (Valley); 3, J. B. Shore (Oswestry); Tooth Carp: 1 and 2, A. Beasley (Oswestry); 3, J. E. Shore (Oswestry); Catfish: 1, W. Parkin (T.A.B.); 2, A. E. Mackay (Oswestry); 3, J. B. Shore (Oswestry); Swordtails: 1, K. Hill (Heywood); 2, 1, J. E. Shore (Oswestry); 2, A. W. Parkin (T.A.B.); Mollies: 1, W. Parkin (T.A.B.); 2, A. Beasley (Oswestry); 3, G. Platt (Oswestry); Platies: 1, J. E. Shore (Oswestry); 2, A. Beasley (Oswestry); 3, Mr. Gardner (Heywood); Guppies: 1, W. Parkin (T.A.B.); 2, 1, Bacon (F.G.A.); 3, E. Preston (F.G.A.); Breeders Egg-layers: 1, J. E. Shore (Oswestry); 2, K. Withburn (Oswestry); 3, W. Taylor (Oswestry); Breeders Livebearers: 1, A. Beasley (Oswestry); 2, J. B. Shore (Oswestry); Breeders Guppies: 1, B. Preston (F.G.A.); 2, A. Beasley (Oswestry); 3, 1, Bacon (F.G.A.); A.O.V.: 1, W. Taylor (Oswestry); 2, W. Parkin (T.A.B.); 3, B. Johnson (Heywood); Pairs Egg-layers: 1, W. Parkin (T.A.B.); 2, J. Piggott (Oswestry); 3, A. Beasley (Oswestry); Pairs Livebearers: 1, J. E. Shore (Oswestry); 2 and 3, A. Beasley (Oswestry); Ostron Janitors: 1, E. Jones (Oswestry); 2, D. Langford; 3, 1, Bolton and T. Sutton; Goldfish: 1, J. Butterworth (Valley); 2, Mr. Milby (Middletown); 3, M. Jones (Valley); Shubunkins: 1, S. Walsh (Accrington); 2 and 3, R. Birch (Heywood); Fanails and Veiltails: 1, S. Walsh (Accrington); 2, A. Phillipson (East Lancs.); 3, R. Birch (Heywood); Orandas and Lionheads: 1 and 2, A. Phillipson (East Lancs.); 3, R. Birch (Heywood); Backscouts: A. Phillipson (East Lancs.); 2, S. Walsh (Accrington).

THE 8th Annual Open Show of the Newport A.S. attracted a record entry with over fifty exhibitors more than 1956. A special display stand of native and tropical marine fish was presented by the International Marine Study Society.

Special awards: Highest aggregate points in show: Mr. C. Barber (Bridgford A.S.); Best Fish in Show: Mr. C. Barber (Bridgford A.S.); Best Pseudotropheus (travassou, no name); Best Goldwater Fish in Show: Mr. P. Player (Barry A.S.); Best Breeders Team: Mr. J. R. Wheeler (Trowbridge A.S.); Best Exhibit by a Junior: Master C. Smithson (Bridgford A.S.); Best Pseudotropheus Aquatic: Mr. P. G. Jones (Newport A.S.); Best Native Marine Exhibit: Mr. T. R. Hill (International Marine Study Society); Best Tropical Marine Exhibit: Mr. D. Brown (International Marine Study Society); Best: Siamese Fighting Fish: 1, Mr. T. G. Wall (Newport); 2, Mr. W. D. Songhurst (Llanwit Major); 3, Mr. W. Smithson (Bridgford); 4, Mr. A. Warratt (Cardiff); Anabantids: 1, Mr. J. R. Wheeler (Trowbridge); 2 and 3, Mr. G. Poyrie (Bridgford); 4, Mr. W. Harding (Barry); 5, Mr. M. J. Perry (Newport); 6, Mr. D. C. Bishop; Barbs: 1, Mr. G. Poyrie (Bridgford); 2, Mr. F. G. Jones (Newport); 3 and 4, Mr. W. Chapman (Newport); 5, Mr. A. J. Payne (Newport); 6, Mr. P. Parsons (Cardiff); Heterostichans and Hypoclinemus: 1, Mr. W. Chapman (Newport); 2, Mr. P. Parsons (Cardiff); 3, Mr. C. Barber (Bridgford); 4, Mr. P. Duke (Newport); A.O.V. Chalcids: 1, Mr. W. Gorrill (Cardiff); 2, Mr. A. Rogers (Llanwit Major); 3, 4 and 5, Mr. W. D. Songhurst (Llanwit Major); Dwarf Cichlids: 1, 2, 3, 4 and 5, Mr. C. Barber (Bridgford); A.O.V. Goldfish: 1 and 2, Mr. W. Gorrill (Cardiff); 3, Mr. P. Parsons (Cardiff); 4, Mr. W. Chapman (Newport); 5, Mr. B. P. Kelly; Corydoras: 1, Mr. G. Poyrie (Bridgford); 2, Mr. J. B. Wheeler (Trowbridge); 3, Mr. W. D. Songhurst (Llanwit Major); 4, Miss J. Wall (Newport); A.O.V. Catfish: 1, 2, 3 and 4, Mr. W. Gorrill (Cardiff); Danios, Barbos and White Cloud Mountain Minnows: 1 and 4, Mr. P. Parsons (Cardiff); 2, Mr. J. Llanos (Newport); 3, Mr. A. Warratt (Cardiff); A.O.V. Egg-layers: 1, Mr. P. Player (Barry); 2, Mr. W. Gorrill (Cardiff); 3, Mr. J. G. Phillips (Newport); 4, Mr. T. D. Davies; 5, Mr. W. Chapman (Newport); Swordtails: 1 and 3, Mr. T. G. Wall (Newport); 2, Mr. W. Chapman (Newport); 4, Mr. A. Williams (Barry); 5, Mr. W. Smithson (Bridgford); 6, Miss B. Brown (Newport); Platies: 1, Mr. A. Rogers (Llanwit Major); 2, 3 and 4, Mr. R. S. Wigg (Llanwit Major); 5, Mr.

W. D. Songhurst (Llanwit Major); 6, Mr. W. Smithson (Bridgford); Mollies: 1 and 4, Mr. C. Barber (Bridgford); 2 and 3, Mr. W. Smithson (Bridgford); 5, Mr. P. Duke (Newport); Guppies (F.G.S.): 1, Mr. B. S. Wigg (Llanwit Major); 2, Mr. R. S. Wigg (Llanwit Major); 3, Mr. R. Wheeler (Trowbridge); 4 and 5, Mr. L. J. Harnett (Newport); 6, Mr. M. Wheeler (Trowbridge); Guppies (F.G.A.): 1, Mr. C. Barber (Bridgford); 2 and 3, Mr. P. Tiddall (Newport); 4, Mr. C. Smith (Cardiff); Breeders Livebearers: 1, 2 and 3, Mr. J. R. Wheeler (Trowbridge); 4, Mr. R. S. Wigg (Llanwit Major); 5, Mr. E. S. Wigg (Llanwit Major); 6, Mr. A. Churchill (Cardiff); 7, Mr. A. J. Payne (Newport); Breeders Egg-layers: 1, Mr. J. R. Wheeler (Trowbridge); 2, Mr. E. Myer (Newport); 3 and 4, Mr. W. Gorrill (Bristol); 5, Very Victoria Goldfish: 1, 2 and 3, Mr. B. A. Harding (Barry); A.O.V. Coldwater Fish: 1, 2 and 3, Mr. P. Player (Barry); Native Marins: 1, 3, 5 and 6, Mr. T. K. Hill (International Marine Study); 2 and 4, Mr. P. Parsons (Cardiff); Tropical Marins: 1 and 2, Mr. D. Brown (International Marine Study); 3 and 4, Mr. E. Jones (Llanwit Major); Livebearers (Janitor): 1, Master C. Smithson (Bridgford); 2, Master P. Wheeler (Trowbridge); 3 and 5, Master N. John (Newport); 4, Miss S. Holder (Newport); Livebearers (Janitor): 1, Master P. Wheeler (Trowbridge); 2 and 4, Master C. Smithson (Newport); 3, Master C. Smithson (Bridgford); Planted Aquaria: 1, Mr. F. G. Jones (Newport); 2, Mr. C. Barber (Bridgford); 3, Mr. L. J. Harnett (Newport).

AT the Tropical Aquarium Breeders' second Annual Open Show the best fish was won by Mr. K. Parkes (Merseyside) with a Tropical Hawk.

Best Breeders award went to Mr. K. Withburn (Dartford). The individual exhibitor with the most awards was Mr. E. Price (Gorton & Openshaw). The trophy for the society with the most awards went to Gorton & Openshaw. Full results were as follows: Guppies: 1, Messrs. Duffy and Bernal (F.G.A.); 2, E. Price (Gorton & Openshaw); 3, Mr. Gorton (Salford); Mollies: 1, W. Parkin (T.A.B.); 2, D. Crook (Glossop); 3, F. Woodward (Blackpool); Swords: 1, S. Kibbide (Stratford); 2, Mrs. M. Crook (Glossop); 3, F. Woodward (Blackpool); Platies: 1, E. Fletcher (Glossop); 2, R. Scott (Stratford); 3, A. Middleton (Gorton & Openshaw); Small Barbs: 1, A. Southgate (Gorton & Openshaw); 2, W. Booth (T.A.B.); 3, E. Price (Gorton & Openshaw); Large Barbs: 1, K. Parkes (Merseyside); 2, W. Parkin (T.A.B.); 3, H. W. Hughes (T.A.B.); Small Chalcids: 1, K. Withburn (Oswestry); 2, G. Crook (Stratford); 3, F. Mulla (Merseyside); Medium Chalcids: 1, E. Price (Gorton & Openshaw); 2, W. Parkin (T.A.B.); 3, F. Woodward (Blackpool); Large Chalcids: 1, A. Wilkie (Stratford); 2, B. Robinson (Merseyside); 3, W. Parkin (T.A.B.); Fighters: 1, U. Allen (T.A.B.); 2, J. Kelly (Merseyside); 3, K. Kerthow (Stratford); Small Anabantids: 1, Miss Smith (Glossop); 2, G. Hodgkinson (Gorton & Openshaw); 3, E. Price (Gorton & Openshaw); A.O.V. Anabantids: 1 and 3, F. Mulla (Merseyside); 2, 1, Greenwood (Gorton & Openshaw); Angels: 1, F. Woodward (Blackpool); Dwarf Cichlids: 1, E. Fletcher (Glossop); 2, A. Southgate (Gorton & Openshaw); 3, B. Phillips (Ashton); A.O.V. Cichlids: 1, B. Moorehead (Merseyside); 2, D. Crook (Glossop); 3, G. Crook (Stratford); Barbos and Danios: 1, G. Hodgkinson (Gorton & Openshaw); 2, S. Tickle (Merseyside); 3, G. Crook (Stratford); A.V. Corydoras: 1, K. Withburn (Oswestry); 2, J. Robinson (Merseyside); 3, A. Southgate (Gorton & Openshaw); A.O.V. Danios: 1, W. Parkin (T.A.B.); 2, F. Mulla (Merseyside); 3, L. Kaye (Huddersfield); Loaches: 1, G. Hodgkinson (Gorton & Openshaw); 2, L. McCourt (Glossop); 3, F. Mulla (Merseyside); Female Livebearers: 1, Messrs. Duffy and Bernal (F.G.A.); 2, Mr. Mangrove (Merseyside); 3, E. Fletcher (Glossop); Female Egg-layers: 1, E. Price (Gorton & Openshaw); 2, K. Parkes (Merseyside); 3, F. Hodgkinson (Gorton & Openshaw); A.O.V. Tropical: 1, G. Harnett (Glossop);

2, A. Wilkie (Stratford); 3, S. Tickle (Merseyside); Junior Livebearers: 1, W. Booth (T.A.B.); 2, Messrs. Duffy and Bernal (F.G.A.); 3, Master Kirby (Merseyside); Junior Egg-layers: 1, W. Booth (T.A.B.); 2, A. Middleton (Gorton & Openshaw); 3, F. Hodgkinson (Gorton & Openshaw); Pairs Livebearers: 1, W. Booth (T.A.B.); 2, J. Hill (Ashton); 3, Mr. Gorton (Salford); Small Pairs Egg-layers: 1 and 2, E. Price (Gorton & Openshaw); 3, K. Parkes (Merseyside); Large Pairs Egg-layers: 1, W. Parkin (T.A.B.); 2, F. Mulla (Merseyside); 3, W. Booth (T.A.B.); Breeders Guppies: 1, Duffy and Bernal (F.G.A.); 2, Mr. Gorton (Salford); Breeders Livebearers: 1, J. Hill (Ashton); 2, R. Wilkie (Stratford); 3, M. Wilde (Stratford); Breeders Egg-layers: 1, 2 and 3, K. Withburn (Oswestry); Goldfish: 1, G. Harnett (Glossop); 2, J. Kibbide (Stratford); 3, J. Greenwood (Stratford).

THE September meeting of the Barry Aquarist Society was held on 27th September. Mr. W. Forns, Vice President of the Society, and his wife, were among members attending. Nominations for the new Officers of the Society are as follows:—President: Mr. J. Beckham; Vice President: Mrs. F. Curry; Vice President: Mr. W. Forns; Chairman: Mr. R. Light; Vice Chairman: Mr. S. Nelson; Secretary: Mrs. V. Toppin; Minutes Secretary: Mr. G. Toppin; Treasurer: Mrs. E. Stear; Show Secretary: Mr. A. Ebramson; Assistant Show Secretary: Mr. P. Player; Auditor: Mr. Gadd; Auditor: Mr. Hines.

A report was given by the Show Secretary, Mr. H. Roberts, of the profitable ventures of the Club during the past few months, such as the Barry Horticultural Show in which the Society were awarded the Gold Medal, the Cowbridge Horticultural Show in which a Silver Gift Medal was won and the Club's Annual Open Show. Thanks were given to those members who had helped to put their shows on. Any person wishing to join the Society should get in touch with Mrs. Toppin, 30 Coigne Terrace, Barry, or attend monthly meetings held on 14th Wednesday of each month at the Co-operative Retail Society Hall, Evelyn Street, at 7.30 p.m.

RECENTLY the Wakefield & D.A.S. were hosts to the York & D.A.S. in a table show and visual quiz competition. The results of the table show which was judged by Mr. J. M. Huxton were as follows: Cichlids and Anabantids: 1, Mr. Potts (York); 2, Mr. Waudby (York); 3, Mr. Curry (York); Livebearers: 1 and 2, Mr. Gorton (Wakefield); 3, Mrs. H. Jones (York); Characins and Barbs: 1, Mr. Cooper (York); 2, Mr. Potts (York); 3, Mr. Piggott (York); A.O.V.: 1, Mr. Curry (York); 2, Mr. Reynolds (Wakefield); 3, Mr. Waudby (York); Best in Show was a Tilapia Mombasa (owned by Mr. Potts (York). The quiz was won by Mr. D. English (Wakefield).

AQUARISTS' CALENDAR

12th November: N.I.L. Aquarium Society, Secretary, Mr. R. Watt, 99 Warwick, East Kilbride.

18th November: Dewsbury and District A.S. Third Annual Open Show in the Further Education Centre, Park Road, Brierley, D. Dunford, Hon. Secretary, 73 Foxroyst Lane, Thorsfield, Dewsbury.

25th November: Pars, Feather and Aquatic Show organized by the Borough Council of the London Borough of Hackney, King's Hill, Lower Clapton Road, E5.

26th November: Leeds and District A.S. Open Day Show.

3rd December: Altrincham & District A.S. Annual Open Show, Galsley Town Hall, N. Leeds. Scheduler available from Mr. G. E. Walker, 2 West End Terrace, Garsley, N. Leeds.



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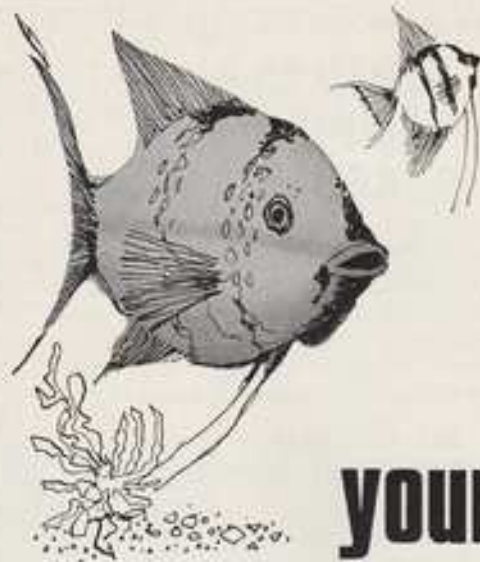
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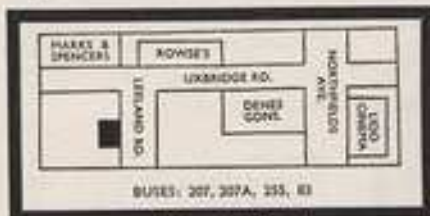
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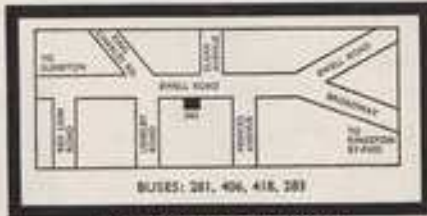
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Tropical Fish in Your Home	35 0	Small 1/2	2 0	Hobby Fish Food	1/4, 1/2
Aquarium Plants (De-Wit)	35 0	Large	2 0	Hobby Leaf Green Flakes	1/4, 1/2
Under the Sea (Barton)	35 0	Hydro four-in-one feeders	2 0	Hobby Leaf Green Flakes	1/4, 1/2
Tropical Aquarium Fish (Newswaterman)	90 0	Small 1/2	2 0	Hobby Leaf Green Flakes	1/4, 1/2
Tropical Fish in the Aquarium (Ludewick)	18 0	Large	2 0	Hobby Fish Food (Breeders Pack)	1/4, 1/2
Freshwater Tropical Aquarium Fishes (Harvey & Ham)	15 0	Hydro four-in-one feeders	2 0	Hobby Blue Daily	1/4, 1/2
Aquarium Care (Borink)	70 0	Small 1/2	2 0	Wunderbar	1/4, 1/2, 1/4, 1/2
Tropical Aquarium Fishes	72 4	Large	2 0		
SOFT COVER BOOKS		WARDLEYS FISH FOODS		REMEDIES	
Tropical Fish (T.F.H. Publ.)	15 0	Vitalizer mix (8 feeds in one)	1 3	Halamid Tablets (New)	4 0
Electricity in the Aquarium (Warburton)	7 4	Supreme Conditioner (Flav. Med., Coarse)	1 3	Vitamin Tablets	1 0
A Manual of Aquatic Plants (Koch)	17 4	Large	1 3	Anti-Chlorine Tablets	1 0
Starting Right with Tropical Fish (Gannon)	4 8	Supersia Homogenized Flava. Pelleted Feed (Flav. Med., Coarse)	8 0	Terraria Chlorine Neutralizer	3 0
Starting Right with Goldfish (Gannon)	4 8	Ec. Coarse	8 0	Ph. Test Kit—	7 4
All About Guppies (Axiomed & Williams)	12 0	Vitalizer (Flav. Med., Coarse)	1 3	Juvel	14 4
Garden Pools (Paul Stainton)	4 0	Hy-Glow "30" Colourfood (Flav. Med., Coarse)	4 4	Senior	4 0
Diseases (Paul Stainton)	10 4	Comunity	4 4	Bromthymol Blue Ph. Indicator	4 0
Marine Aquarium	32 4	Fry-Fare Guppy Food Lgh.	2 8	Aquatic Tonic (general tonic and remedy)—	3 3
How to Keep and Breed Tropical Fish (Dr. Emmens)	12 0	Holly Fry	2 8	4 R. ss.	10 0
All About Aquariums	9 0	Fancy Guppy Food	4 4	Anti-Chlorine Compound—	2 4
The Educational Aquarium	4 0	Guppy Fry	2 3	1 R. ss.	8 0
Your Terrarium	4 0	Small 1 3	2 3	4 R. ss.	8 0
Beginning with Tropicals (Stoddard)	12 0	Large 2 3	2 3	Aquapure (clears cloudy water)—	2 4
Marine Tropicals	12 0	Dried Daphnia	2 3	1 R. ss.	8 0
All About Breeding Tropical Fish (T.F.H. Publ.)	10 4	Small 1 3	2 3	Fungus remedy (antifungal and stabilizer)—	3 3
Breeding Aquarium Fish	10 4	Large 2 3	2 3	1 R. ss.	10 0
Aquarium Hygiene	10 4	Med. 2 3	2 3	4 R. ss.	10 0
Pond Life in the Aquarium	10 4	Large 2 3	2 3	Spruce Plant Food	2 4, 5 0
Diseases of Aquarium Fish	10 4	Small 1 3	2 3	Neochlorine Blue	4 0, 10 0
T.F.H. PUBLICATIONS 3/- EACH		Liver Meal	2 3	Gerraphin Combats Disease in Aquarium	4 0
Flies and Mosquitoes	3 4	Small 1 3	2 3	Superchlor Removes Chlorine Instantly	2 4
Tropical Fish Guide	3 4	Beef Meal	2 3	A.G.F. Free Prevents Algae	4 4
Beautiful Bettas	3 4	Small 1 3	2 3	Buffer Tablets. Maintains neutral water	4 4
Tiny Tetras	3 4	Fish Meal	2 3	Fung. Free. Two-way treatment for fungus in-fections	4 4
Beautiful Goldfish	3 4	Crab Meal	2 3	All Clear (Algalicide)	4 0, 12 0
T.F.H. PUBLICATIONS 1/- EACH		Small 1 3	2 3	Superonic	4 4
Ants	1 0	Brine Shrimp Kit	4 0	Apral (White Spot Cure)	5 11
African Barb	1 0	Tri-Pellets	4 0		
African Cichlids	1 0	Hi-Protein	4 0		
Angel Fish	1 0	Brine Shrimp Pellets	5 3		
Aquarium Plants	1 0				
Argentine Pearl Fish	1 0				
Aquarist Repair Manual	1 0				
Betta	1 0				
Beginning the Aquarist	1 0				
Breeding Egg-layers	1 0				
Breeding Livebearers	1 0				
Catfish	1 0				
Cichlids	1 0				
Danio	1 0				
Decorative near Aquarium	1 0				
Disco	1 0				
Diseases of Tropical Fish	1 0				
Dwarf Cichlids	1 0				
Fancy Guppies	1 0				
Garden Pond Construction	1 0				
Tropical Fishkeeping	1 0				
Goldfish	1 0				
Popular Pass and Torosias	1 0				
OTHER BOOKS		TETRAMIN FISH FOODS		Tetracore	
Aquatic Insects	1 4	Tetramin Staple Food for Tropicals	1 11	General Tonic. As a regular tonic in the Aquariums. Floripride. Aquarium plant and water softener. Blackwater tonic. Reproduces natural tropical soft acid water conditions in Aquariums.	
Tropical Fishes	2 0	Size 1	1 11	Fungation. Cures body fungus, fin and tail rot, etc.	
Live Foods	2 0	2	1 11	Contra-Cl. Cures White spot, Shimmy and Combs.	
Marsh Gardens	1 4	3	1 11	Covers Chlorine. Neutralizes chlorine contents of fresh sea water.	
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