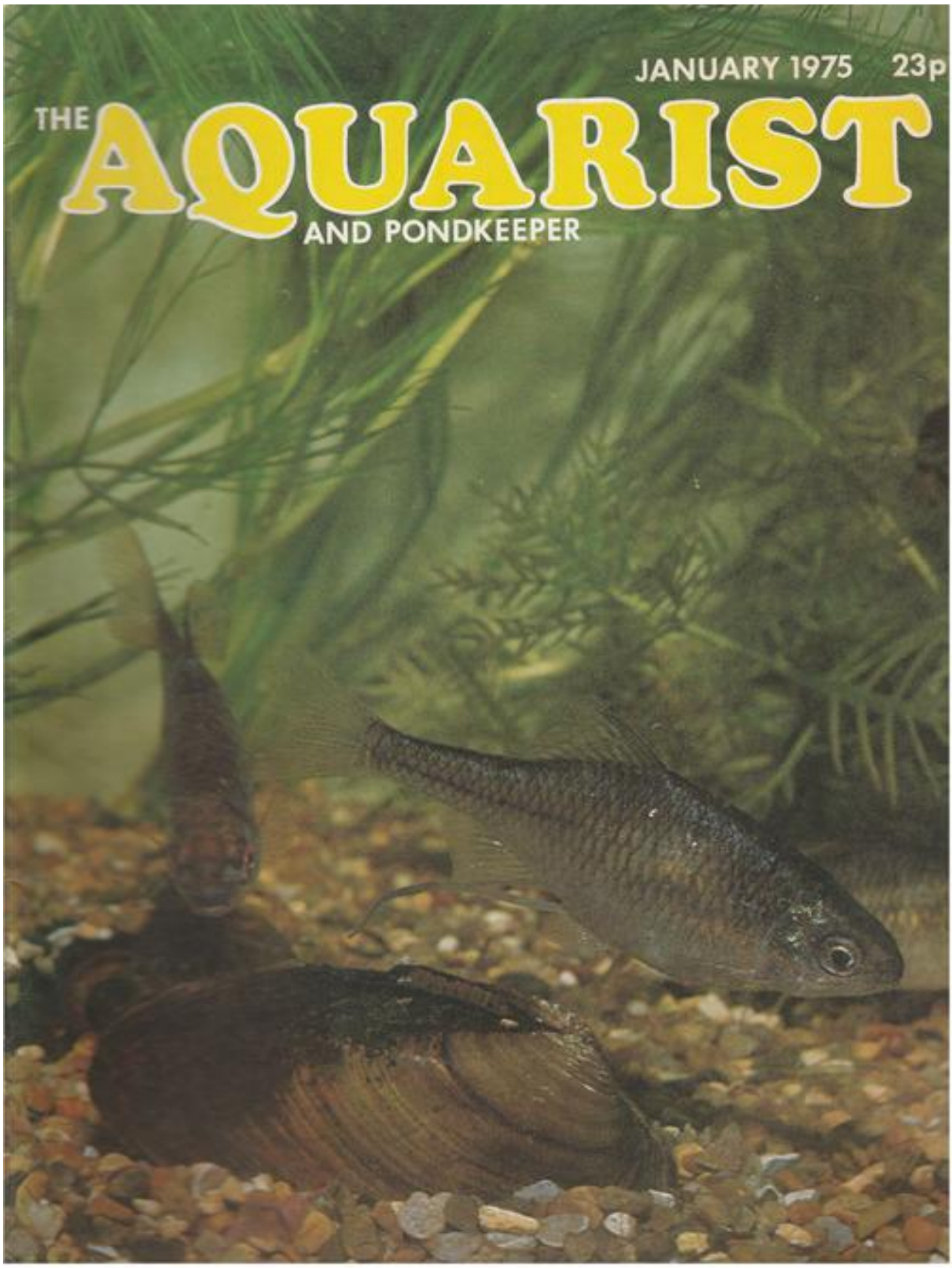
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THE AQUARIST
AND PONDKEEPER

THE AQUARIST AND PONDKEEPER

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Our Cover:

Pair of Bitterling, female on right examining mussel preparatory to spawning

WHAT IS YOUR OPINION?

by B. Whiteside, B.A.

Photographs by the Author

HAPPY NEW YEAR! I hope that, for us all, 1975 will be a peaceful year during which our fishes and plants thrive and our interest in the hobby continues to grow. I can think of no more peaceful occupation than sitting gazing at a furnished aquarium containing beautiful fishes and plants in good health; and I hope that this feature will continue to help many of you to be able to enjoy such experiences.

Mrs. M. L. Rimmer, of The Bungalow, Aberbrwynen, Llanfarian, Aberystwyth, Dyfed, writes: "I have read, with great interest, your writings about your angels. I have reared three angels and was most amazed to see two of them cleaning a large Amazon sword plant leaf and then laying eggs. These fish are only three months old but are about 4 in. deep. It was the most frustrating thing I ever saw for as fast as the eggs were laid, a neon ate them. What I should like to know is: If I put them in a tank by themselves what do I put in for them to lay on? If they do lay do I leave the parents with the eggs to hatch them or do I hatch them artificially? If the latter, how?" (A large Amazon sword plant, or a piece of slate rested against the end of the aquarium, should provide a suitable spawning site. The parents may be left with their spawn to see if they successfully hatch it and raise the fry. If they don't, after the following spawning the adults may be removed. Methylene blue may be added to the water to discourage fungus, and an airstone placed near to—but not too close to—the spawn to provide water circulation. When the fry begin to hatch, appropriate foods for the fry may be added.) "On one of my tanks, size 39 in. × 12 in. × 15 in., I use a 60 watt bulb lit for twelve hours per day all the year round. The plants do very well, particularly *Cabomba*, Amazon swords and *Cryptocoryne* species. The other tank, size 36 in. × 12 in. × 12 in., is lit by two 30 watt strip lights. The plants never seem to grow at all; in fact most of them die sooner or later. The fish do not seem to differ in growth but guppies and platies seem to have a lot more colour." (I also find that plants grow best under ordinary tungsten bulbs—although some fluorescent tubes, such as Gro-Lux, produce brighter colours from red and blue fishes. A combination of both types of lighting may give the best of both worlds.) "The best way I find to hatch brine shrimps is in a floating jam jar directly under the aquarium light, and with an air stone going as strongly as possible. I think that a good topic for future discussion would be how to set up a *Daphnia* pool, and how to feed the animals once the pool is set up. Please carry on with W.Y.O.? as it is the only regular feature giving information to breeders such as myself. I think the only way to improve your feature would be to lengthen it." (I'm glad you enjoy the feature, Mrs. Rimmer. Unfortunately pressure on space means that this feature has to be shortened. I'd be pleased to receive readers' comments on operating a *Daphnia* breeding pool; and readers' suggestions for fishes and their breeding techniques, to be discussed in future features.)

Our second letter also comes from a Welsh reader, Mrs. E. M. Brown, of Gilfach-Wen Farm, Six Bells, Abertillery, Gwent, and she is not too keen on aquarium clubs the main aim of which is to show fishes. She writes: "It is the insistence on showing, by clubs, which has kept me from joining them in the past; and it is also why I and six others started a fish club, in Abertillery, in April of this year. The aim of our club is to help people starting out, and ourselves, by practical assistance and discussion of our problems, etc. At the time of writing our numbers are 23, and we have at least one new member at each meeting, most of them saying, 'If you start showing I'm out!' We visit each other's homes (when invited) and so see each other's tanks, fish, etc. We meet each fortnight and up to now have not needed a speaker. We do plan to have some later when we need them. I know the show fanatics will say, 'You don't have to show if you don't want to.' However, I feel there is no point in belonging to such a club as I have nothing in common with its members. The way our club is growing I know there are many *fish lovers* who feel as we do . . ."

From 18 The Heath, Tonkerton, Whitstable, Kent, comes a letter from Mr. N. K. Clayton. He says: "I offer a brief description of my marine filtration method in response to your question in the November issue. The method described here is both unconventional and expensive but the results, I feel, justify the expense. The aquarium is a 40 gallon, all-glass unit, illuminated by two 40 watt colour corrected fluorescent tubes for 10 hours per day—winter and summer. *Algae* and higher *algae—Caulerpa* and *Grassifolia*—grow profusely. The basic area is covered

by two perforated plates topped with 3 in. of crushed shell, silica gravel and coral sand. Water is pumped from beneath the filter plates by individual power filters containing only activated carbon. Wool is not included to minimise the removal of Phytoplankton and Zooplankton. The water, before entering the power filters, is piped through an '*algae* filter'. This is constructed from perspex to form a shallow tray. The *algae* filter is situated on the sill of a window which receives direct sunlight for a large proportion of the day. The return pipes from the power filters feed into a single spray tube running the length of the tank. The jets of water and air in a compressed state create a beneficial turbulence and aerate the water, thus eliminating the need for air pumps of any kind.

"The combination of fast flow rate, activated carbon and the large surface area of *algae* in contact with the water ensures optimum removal of organic proteins, phenols and gases. Nitrite readings are so low that detection is not possible with present test kits—standing for some hours and looking down the length of it. The p.H. remains constant for a phenominal length of time even when water changing is discontinued. Marine life of the more difficult types, e.g., *P. chaetodonoides* (clown sweetlips), *Lima scabra* (flame scallop), appear to thrive under these conditions. Specific technical details have been omitted for reasons of space. I would be pleased, however, to answer any questions or constructive criticism of my method, via the magazine or at my home address."

Mr. S. Rhodes lives at 109 Oakwood Avenue, Flanshaw Park, Wakefield, Yorks. He writes: "I have four cultures of white worms. They are kept in 2 in. deep boxes of peat but do very poorly. I have tremendous success with brine shrimps. I cut the bottom off a plastic 'pop' bottle, invert it, and use silicone sealant to fix an air line in the cap. I have eight of them going: they stand in plastic, flat-bottomed bottles. For collecting the shrimps I turn off the air supply, leave for a few minutes, and then siphon off the shrimps. The largest number of fish I have had from one spawning was just over 400; the fish were angels."

No. 32 Keats Gardens, Farmhill, Stroud, Glos., is the address from which Mr. I. Willey writes. "A much better worm to feed to fish is the grindal worm, which I have bred in polystyrene boxes, size 12 in. × 10 in. × 4 in., filled with compost bought from Mr. E. L. Arnold. The compost is damped down with warm water; a groove is made; the culture is put in; and some food—bought from the same source—is sprinkled on the compost. The compost is firmed and a piece of glass placed on it; it is covered with a polystyrene tile. The box is placed on top of the aquarium hood and after three days the glass is covered with worms which can be fed to the fish. Because of the size of the worms they can be eaten by even the smallest fish . . ."

Mr. S. Fox, whose home is at 126 West Farm Avenue, Longbenton, Newcastle upon Tyne, needs no introduction to readers of this feature. In his most recent letters he has the following to say. "It is possible that some aquarists may not know that their lack of success in hatching brine shrimp eggs may be due to the eggs in their containers being in a damp state. In this condition the eggs will not be viable and as a consequence they will fail to hatch out. If dampness is suspected it is advisable to remove the eggs and place then on a clean, dry surface, scattered thinly. Leave the eggs in a warm room for at least 48 hours to become air dried. Direct heat must not be used to hasten the drying process. The container must be completely dry before the eggs are returned; and when not in use the container must be tightly sealed against moisture. There are several recipes that can be used to hatch brine shrimps. Unfortunately no one can guarantee that any one method will be more successful than another. I find the following method reliable. Fresh water from the tap must not be used; the water should be 'aged' for 48 hours prior to being used. The salts should be dissolved in warm water, in an old teacup. The amount of salts advocated is based on the assumption that quart-sized jars will be used to hatch the eggs; if another size is used the amount of salts should be appropriately adjusted. ¼ level teaspoon of Epsom salts; ¼ level teaspoon of Glauber salts (sodium sulphate); ¼ level teaspoon of Tidmans or non-iodized salt. Add the salt solution to the quart container and stir well. Add a ¼ level teaspoon of eggs. The temperature should be maintained at 72-78°F., and aeration of the solution is recommended. The procedure can be duplicated every second or third day after the first batch has started, to ensure a continuous supply of shrimps. The shrimps should be washed free from salt before being introduced into the aquarium as the salt can accumulate and damage some species of plants."

Mr. Fox has the following information to impart about aquarium plants. "Towards the end of their growing period plants accumulate more food materials in their tissues than they really need. When this occurs the enzymes concerned with growth are inhibited, thus forcing the plants into a period of minimum activity. As the recessive or rest period begins the plants slowly adjust to the changed conditions. Normally plants need time to adjust to a new environment; an average period of adjustment may take up to three months for most plants—that is, for plants that are at maximum activity, which is at the peak of the growing season. When newly acquired plants are introduced into a fish tank during their recessive period, the plants are subjected to two natural forces: one is to continue the rest period that

has been interrupted; and the other is to adjust to the new environment. Obviously the plants cannot undertake fully, or successfully, both activities at the same time.

"Aquatic plants that are placed into a new environment in the early stage of their recessive period will seek to adjust to the new conditions. In this instance, when the plants' recessive period has been interrupted, and bearing in mind that the plants take time to acclimatise to new environmental conditions, one will find that when the next maximum activity period commences—that is, the plants' growing season—then the plants will not, in some instances, respond in the normal way by growing at their maximum rate for their particular genus. In this case aquatic plants will often require up to a year to fully recuperate. The time will vary according to the genus and species.

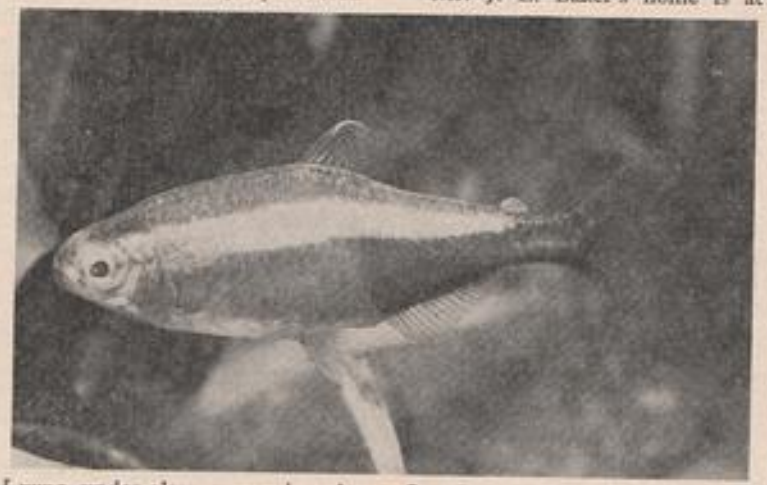
Although plants may not grow at their normal rate, they do continue to grow; but the growth rate may be barely perceptible to the observer.

"When plants are placed into a new environment late in their stage, it is probable that they will continue with their rest period. At this stage plants may deteriorate in health; or may, on occasions, die due to the interruption of their rest period and with having to adjust in a new environment when their natural resilience is at a low ebb. However, a small minority of plants do benefit from being moved to a cooler and darker location, e.g., *Aponogeton* species. With the exception of the latter-named plants, the aquarist should not reduce the lighting on his aquaria—either in intensity or duration—during the recessive period, in the belief that light is not too important at this time. To do so will place an additional strain on the plants' physical resources. Therefore, apart from removing dead and decaying foliage, and perhaps a little judicious thinning out, it is advisable to leave plants alone during their rest period. In addition, it is not good aquarium management to add a number of new plants into an established aquarium during this period." (Mr. Fox has made some interesting comments in his letter. I'd be pleased to receive readers' comments on them. I would like to remind readers that I do not necessarily agree with readers' opinions and that I accept no responsibility for the views expressed by readers in this feature.)

I was pleased to receive another letter from Dr. J. Neville Carrington, of Interpet, as it is always encouraging to hear from top experts in the field. Dr. Carrington writes: "On page 301 (of the November, 1974 edition) one of your correspondents talked about the problem of cloudiness over eyes on angelfish. This is a common difficulty with angels and can be overcome very easily by adding Liquitox to the water, at the correct dosage. Some people have trouble with Liquitox because they do not bother to read the instructions properly. Liquitox comes in capsules, each containing enough oily liquid for 4 gallons of water. This liquid will harm the fish if it is just squirted into the tank; and it is absolutely essential that it is shaken up thoroughly with water—it dissolves more easily in hot water—before being poured into the tank. The user should also check that it is fully dissolved by looking at the solution before pouring it in. Another query that we sometimes have regarding Liquitox is the instruction that it should not be used in conjunction with a carbon filter. In fact no remedy should be used in conjunction with a carbon filter, but the reason with most remedies is different to that with Liquitox. As far as Liquitox is concerned, the active principle, phenoxetol, has the property of washing toxic materials off carbon. This property is known as elution. Clearly, therefore, if the carbon has adsorbed toxins out of the water, and Liquitox is

added, then the toxins can be released into the water so killing the fish. With most other remedies the reverse situation applies in that carbon will *adsorb* the remedy from the water so very quickly, rendering (the remedy) useless." (For those who do not already know, adsorption is the ability certain substances have of concentrating *on their surface* certain other substances—such as gases, dyes, etc. It is a different property to that of absorption.)

The ladies have certainly taken up my recent invitation to send me their opinions. The next letter reached me from 75 Mellstock Avenue, Dorchester, Dorset, and was written by Mrs. G. A. Cook. "My aquarium is a sort of glass window-box. The north-facing window is double glazed now it is winter; and the aquarium size is 34 in. × 7 in. × 9 in. high. Green plastic between window and aquarium in summer; polystyrene for cooler weather; top covered with *Salvinia* and *Lemna*, under glass, to regulate the light; thick in summer and almost all off in winter. *Cabomba* and *Sagittaria* grow like weeds and need pulling out in handfuls every few weeks. Amazon swords also do well. Several *Aponogeton* species I bought grew so well that they took over and had to be given away; they did very poorly under lamp light. Several other plants species, that I don't know, grow well; but *Bacopa* and Java fern refuse to grow. Does anyone know why? The fishes kept are mosquito fish and *Corydoras* species (five). The latter make it difficult to keep the plants looking clean as they are for ever stirring up the bottom water—even though the planting medium is almost covered with a single layer of smooth stones of just under ¼ in. in diameter. Four young black mollies make up the population. My son breeds them so I change them for new ones as soon as they become a hazard to the young mosquitoes. These mollies deal with most of the *algae* problems—together with a tooth brush rubbed over the front glass once per week."



Photograph 1 shows a golden "ram" and photograph 2 a cardinal tetra. I should be pleased to hear of your breeding experiences with either or both species. To date neither species has decided to spawn in any of my tanks.

In an attempt to cut down on the costs of electricity of late, I've been keeping my aquarium lights on for only six hours per day—and I've noticed a slowing down in growth of many aquatic plants. Water wistaria seems to have been quite badly affected, with little new growth; and duckweed plants have become very small indeed. Java fern, which doesn't need too much light, continues to thrive. What have been your experiences with plant growth when light levels have been lowered? Have you noticed any seasonal changes in fishes or plants with the coming of the shorter days?

Mr. J. E. Baker's home is at 22 Comet Close, Lyneham, Wilts. He writes: "I would like to tell you about my experiences with keeping tropical marine fish whilst I was with the R.A.F. in Gan, at the end of 1973 and the beginning of 1974. Gan is a small island, part of Addu Atoll, in the Maldive Islands, in the Indian Ocean. Being a coral atoll, the area around Gan, especially on the lagoon side, abounds with brightly coloured marines. Unfortunately, being so isolated from the rest of the world so to speak, I had to make do with three small tanks: one 12 in. × 9 in. × 9 in. of glass, and two perspex tanks of 12 in. × 12 in. × 9 in. high, made myself from materials acquired on the island. My equipment consisted of two air pumps, sent out from the U.K. That was all. I had no filtering equipment, and heaters were not required out there. Mind you, I had to make many trips of a hundred yards or so down to the beach to fetch a couple of gallons of fresh sea water. I think I must have changed all the water at least three times a week for eight months. At some time or another during that period I kept one or more

of nearly all the small coral fishes easily caught in the shallow waters around Gan. Perhaps some of your readers would be interested to hear of my experiences with some of the more common species. *Dascyllus*—humbugs: These pretty little fishes were the most easily caught fishes. I had one of the tanks inhabited by only small ¼-½ in. humbugs. They were a delight to watch, with their short, sharp, jerky motion. When their tank was approached they would all instantly disappear into the coral, only to appear when the danger had passed. Very easy to keep; very peaceful; and a beautiful sight to watch.

"*Chaetodon:* I didn't have much success with any of the many types I kept. I think the small size of the tanks had a lot to do with this. My specimens were always very young ones, about 1-1½ in. long, and were very easily upset by any other fish in the tank, including their own species. Damsel fishes—*Abudefduf, Chromis, Pomacentrus:* These include many easily kept fishes. However, I did find that all these fishes were very territorial and would quickly attack any fishes approaching their established home. A quick tip here for putting new fishes in an already populated aquarium. Remove coral, rocks, etc., and place new fish in tank. Now replace the coral and rocks, but in different positions. This is the important part because the old residents are too busy sorting out new homes and territories to worry about a new face. I have tried this and it works—especially with damsel fishes. Moray eels: I kept many small specimens at some time or other, but could not get any of them to really settle down. I also found that a tightly fitting cover was needed over the tank, complete with a weight, or the eels were on the floor in the morning, and one had to tread carefully. Six-lined grouper: One of the most interesting fishes I kept was a small one of about 2 in. It would only eat live food—mainly small fishes—and when they were all gone it started on the other occupants in the tank. I would not recommend this as a community fish.

"*Rhinecanthus aculeatus*—Hawaiian trigger: One of my favourites; very colourful; would eat anything, including the other much smaller occupants of the tank. If he couldn't eat it he would attack it anyway—especially six-lined groupers. Finally, in my opinion, the most impressive of all fishes—the lion fish, zebra fish, scorpion fish, call it what you will. It was kept in a tank with only a small specimen of a stone fish; very easy to keep but would only eat live food which it would hover over, head down, and suddenly snap at. It soon outgrew my tank and had to go back into the sea. I have seen specimens, while out swimming, which were about a foot long, with 'wings' about 18 in. across. With the scorpion fish and the stone fish in the same tank any mistake in feeding, water changing, etc., could, at worst, have been fatal; and at best extremely painful. All my fishes, except the live food eaters, were fed only Tetramin flake foods of various kinds, and most lived quite happily in their very cramped quarters.

"On my return to the U.K. in April I decided I

Continued on page 383

BOOK REVIEW

Tropical Marine Invertebrates of Southern Florida and the Bahama Islands *by Warren Zeiller. Published by John Wiley & Sons at* £10·75.

There is a rapidly increasing interest in marine invertebrates with a consequent demand for good works of reference supplying pictorial identification, accurate taxonomy and description. In this work the author has selected some representatives of six phylas which may be encountered on the shore line or in the shallows of southern Florida and the Bahamas.

Every species described is illustrated with a colour photograph and accompanied by the specimen's phyletic lineage from phylus through family, its generic and specific names and the etymology of its names (e.g.: the Spiny Sea Star, *Echinaster sentus; Echinaster* from Greek for spiny and star; *sentus* from the Latin for thorny).

The photographs are of the highest quality and exploit the wide colour scope afforded by gaudy shrimps and crabs, bizarre sea-slugs, filamentous jelly-fish and colourful corals, starfish and sea-urchins.

As the author says in his introduction: "At this stage of aquarium technology it is easier to portray hundreds of marine invertebrate forms in a book than to display them alive. The word 'alive' must be differentiated from holding them for a time until they die of starvation or other causes. Rather, they must be able to continue life as in the sea itself by being provided with a reasonable simulation of their natural environment. Achievement of this in closed-system aquariums like those maintained by hobbyists and inland oceanariums is difficult. Even such open systems as those found in installations fringing the ocean have their share of problems in spite of the continuous pumping of filtered seawater through their aquariums." However, he remains optimistic in his belief that with an increasingly widening interest, difficulties will be overcome in many cases and he forecasts that the hobbyist "with his infinite patience and continuing loving care will add as much to our knowledge as anyone." It's good to see a specialist like the author according due credit to the enthusiastic layman who expends so much time and cash in the pursuit of knowledge.

Rhamdia queleni

Written & Illustrated by Jack Hems

I DOUBT IF THERE has ever been more different species of catfish around than at the present time. *Rhamdia queleni* is one that turned up in a local dealer's establishment not very long ago. It is a member of the family Pimelodidae (Naked Catfishes) and was first introduced into Europe (Germany) in 1934. It is native (according to reliable authorities) to southern Brazil through to La Plata.

Professor G. Sterba gives its maximum length as nearly 14 in. In its smaller sizes it does no harm in a community tank housing the usual selection of popular tropicals. Yet there is no question that when it reaches about 7 in. it can, and will, swallow a half-grown cherry barb (*B. titteya*), guppies, and the like. Be this as it may, *R. queleni* is neither a bullying nor overtly predacious fish. It is merely possessed of a large mouth capable of gulping down quite bulky food.

For much of the day *R. queleni* stays quiescent in a dark corner of its tank or behind rockwork or a thicket of plants. And judging from my own observations of the habits of this catfish, it appears to remain indifferent, that is during its resting periods, to the movements and quite close proximity of the other fishes sharing its tank. At night, however, it becomes extremely active and, moving across the floor of its aquarium and up and down in the middle levels of the water, plays its long maxillary barbels over its companions, the plants and other objects in the tank.

In the matter of food, this catfish has a great fondness for worms, even such diminutive species as *Enchytraeus albidus* (the common whiteworm) and will clear up scores of them in next to no time. Clearly, though, its build and its appetite merits the addition of bulkier nourishment, and pieces of raw lean meat, or slivers of uncooked cod or fresh haddock, should be included in its diet. It does not turn its nose up at dried food but, naturally enough, this should be offered in the form of large flakes.

R. queleni is near enough a typical pimelodid in finnage and shape. That is to say, it has an elongated body, rounded at the front and rather flattened from side-to-side at the rear, a very long-based adipose fin and spined (anteriorly) dorsal and pectoral fins. In colour it changes from an almost uniform pale grey, with light underparts, when young, to a darker grey on the back and upper sides when adult. Under a good top light, or side light, the flanks reflect a shifting lavender or bluish sheen. Again, a faintly discernible concentration of darkish pigment behind the gill-covers (in young fish) assumes a more noticeable brown overcast with blue as the fish increases in size. At about the same time faint brown or darker grey flecks on the sides become more numerous and noticeable. Similar flecks or irregular spots adorn the adipose fin.

Most of the membranes of the dorsal, pectoral, ventral and caudal fins are glass clear, but the dorsal fin has pale brown markings across the base and upper

half, the anal fin too, but not so marked, and the ventral fins, caught in a strong light, display some white or silvery blue on the anterior rays. There are six barbels. The pair on the upper jaw (the maxillaries) are very long, the two pairs below are much shorter. If laid back along the sides, the maxillary barbels reach more than halfway along the body. It is not customary, however, for the fish to fold its maxillary barbels back against its sides. As a rule it holds them in a forward position or at right angles to the head. They can be moved, like the other barbels, independently to each other.

Temperature and the chemistry of the water appear to be of no great importance to this fish providing it is kept at a range of from about 70°F (21°C) to 80°F (27°C) and conditions are clean and neither unreasonably hard and alkaline. There are no records of *R. quelení* spawning in captivity and I do not know what secondary sexual differences, if any, exist.

Echinodorus cordifolius

By Phillip J. Brown

Echinodorus cordifolius (Linné) Griseboch, originates from the middle and southern states of the United States down as far as Mexico. It is the Amazon Sword plant for the large aquarium, the leaves and stalk attaining a height of thirty-five inches under good conditions. The broad heart-shaped leaves can be up to nine inches long and seven inches wide with two to four prominent veins arising at the base of the leaf. These leaves usually have brownish translucent spots upon them up to about an inch in length. When young the leaves are broad but ovate, developing into their characteristic heart shape as they grow older. Emerse leaves, for it must be remembered that the genus *Echinodorus* is a genus of swamp plants, are similar to the submerse but thicker.

Only mature plants (over about two years of age) will send up aerial leaves, usually accompanied soon afterwards by the flower stalk. (Inflorescence.) To achieve this the aquarium needs to be large and with a water level sufficiently low (e.g., twenty-four inches) for the leaves to be able to grow above the water.

This is a plant that prefers a lot of light. Natural sunlight is best but it will grow strongly under an artificial source. It is best planted in a flower pot with a rich substrate of loam or clay and mud. Topped off by a layer of gravel, the flower pot can be placed in the bottom of the aquarium and hidden by the use of gravel, rocks or other plants. A central position or slightly to one side of the centre is best for this plant which will soon develop into the showpiece of the aquarium.

It will grow best in the summer and then likes a temperature between 68°-77°F. In the winter cooler conditions will allow it to rest. Soft water is its natural environment but a hardness of up to 14DH will be tolerated by this hardy plant.

Under good conditions a mature plant will produce numerous flowering stems throughout the summer. The inflorescence is branching, bearing whorls of large white flowers with yellow centres. The petals are long, the flower having between 12-20 stamens. The resultant fruit reaches a length of about an inch, about half of that wide. Abundant seeds are produced and these can be germinated in damp sand under humid conditions. As soon as the first leaves appear the seedlings should be replanted in small pots of loam and sand.

These small plants can be grown submerse or emerse. In the aquarium they should be put in a favoured position where plenty of light can reach them. Once established they will grow quickly but it will take a couple of years before they can reproduce themselves.

If grown in deep water and the inflorescence is kept submerse, adventitious plantlets will be formed along it. These can be planted out once they have attained sufficient size. Like the seeds these are best planted out in small pots of loam and sand.

The rootstock is thick, the main axis usually lying along the bottom, rooting at all the nodes. Old mature rootstocks can be divided and the two halves of the plant replanted into separate pots. Once they have picked up, the two halves will do perfectly well.

Echinodorus cordifolius is a beautiful plant well suited as the centrepiece for any large aquarium. Its rich green leaves grow quickly and after flowering it is safe to cut off the aerial leaves when a profusion of submerse leaves will develop. Under good conditions it can be easily propagated whether by seed, adventitious plantlet or division of the old rootstock. It is a common plant found in most aquarium shops but it will occasionally be found under the name *Echinodorus radicans*.

WHAT IS YOUR OPINION?

Continued from page 380

would like to continue fish keeping as a hobby, but was shocked to see the prices dealers were asking for marines. To think of all the humbugs at £1·95 each that I fed to my other fishes was a bit un-nerving; so I had to settle for freshwater tropical fishes which, I might add, are in many cases just as pretty and interesting."

The last of this month's letters comes from Mr. P. J. Hunt, who lives at "Stoneleaze," 3 Elm Close, Laverstock, Salisbury, Wilts. Mr. Hunt tells us that he has two 18 in. tanks, one coldwater and one tropical, in his living-room. Each is lit by a 30 watt tungsten tube for about 9 hours per day in winter and 5 hours per day in summer. The plants grow well. He continues: "I breed white worms in 6 in. × 4 in. plastic seed trays. These are filled with peat which is kept damp—almost wet in fact. A 3 in. square of glass is placed in the middle and the food placed under it. The tray is then covered with polythene to keep in the moisture, and the whole lot covered with a piece of card. For food I use 'High Protein Baby Cereal,' obtainable from a well-known national chemist shop. I find this an excellent food; it mixes easily, is cheap, and does not go mouldy for nearly a week—by which time it should have been eaten up."

For a future feature please send me your opinions on the following: (1) What is your opinion of non-flaked fish foods? (2) What is your favourite motor filter and what are its advantages? (3) What is your favourite outside air operated filter? What are its main advantages and disadvantages? (4) What have you found to be the most suitable conditions for successfully cultivating *Aponogeton fenestralis*—the lace plant? (5) As this is the New Year issue, what new type of aquarium product would you most like to see produced in 1975? (6) Please send me details of your breeding experiences with very large cichlids. Forward your letters to me c/o "The Aquarist," and please PRINT your name and address clearly.

PRODUCT REVIEW

Aqua Joy Enclosed Motor Filter, manufactured in Germany, and distributed in the United Kingdom by Interpet, Dorking, Surrey. Price £25·37.

The Press release I received with a sample of this new product provided the following information. "This is a new German motor filtration system involving a special biological filtration pad. The filter box, which has 28 sq. in. of filtration, is divided into two chambers: one for normal filtration, and the other for biological filtration or for the treatment of water with special media such as peat fibres, ion-exchange resins, etc. The unit is easy to maintain and the method of driving the pump gives a silent and trouble-free motor system whilst giving a neat design with the motor incorporated under the main filter body."

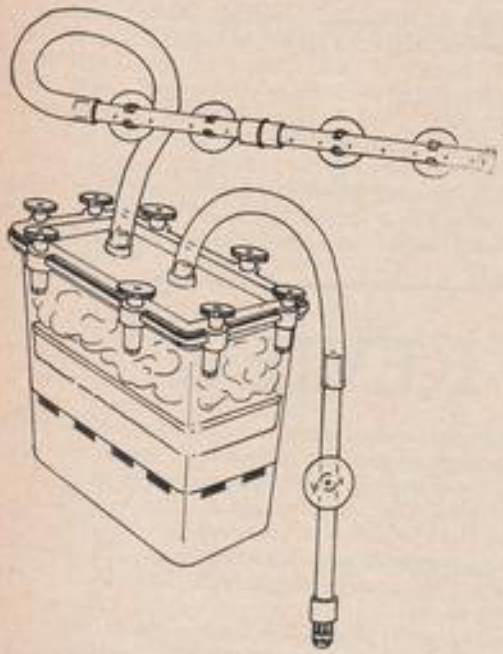
The unit is soundly constructed of thick green plastic which, being transparent, enables one to see inside the filter container. The lid is held in place by eight robust metal screws and nuts, the latter being designed for easy removal by finger and thumb. On top of the lid are two projections on to which transparent green, plastic tubes are fitted: one for an outlet and one for an inlet. Supplied with the unit are two appropriate lengths of tubing and an assortment of plastic suckers, rigid plastic tubes, "elbow" pieces, siphon, sieve, etc. These can be fitted in various ways and combinations to suit a variety of tank sizes. The inlet rigid tubing can be cut (I used a junior hacksaw) to the required length to almost reach the surface of the gravel in a given aquarium. The sieve can then be fitted. (I found it best to cut this tube so that when the sieve was fitted it was about 1 in. from the top of the aquarium gravel. This helps to prevent the siphon inlet from getting clogged with, say, pieces of plant leaves, etc.)

The outlet tube of the filter ends in a "spray bar" which can be mounted under the top frame of the aquarium. In such a position it can be angled to spray a number of fine jets of filtered water over the surface of the aquarium. (In practice I found that to obtain this effect one had to lower the water level in the aquarium. I decided against this and mounted the spray bar, in a full tank, with the jets under water and pointing downwards. This arrangement provides excellent water circulation along the back of the tank—although it cuts down on aeration.)

The lower chamber of the filter box contains a "special filter foam substance which carries biological life." It must be cleaned, when dirty, using only clean water. After three such cleanings the filter pad should be replaced. I filled the upper chamber with Interpet filter wool as I did not wish to adjust the pH or hardness of the water in the tank in which the filter has been under test. The Aqua Joy is supplied with a

useful length of three-core cable and filter tubing; however, both items limit the distance from the tank at which the unit can be sited, and as the unit needs a substantial "site" this can present some problems. (I tried several arrangements, bearing in mind that a solid shelf would provide the best "base" or "site" for the unit. In the end I decided to place it on a window-sill, behind a curtain, where it is completely hidden from view in the room—although visible from outside.)

When I finally got the filter set up and the tubes connected and in place, I switched on the motor.



Nothing happened. I then had to work out how to get the water circulating, and must admit that I did so by trial and error. The answer, as I finally discovered, was to remove the eight nuts, then the lid, and almost fill the filter box with water. When the lid was replaced and the nuts tightened, the motor was again switched on—and the filter began to work. I let it run for a few minutes and decided to remove the lid again to see what had happened inside. Unfortunately, I had decided to site the spray bar under water and did not remember that this would cause the water to back siphon towards the unit when the lid nuts were loosened. A flood of water on to the window-sill taught me a speedy lesson—as did a soaking curtain. However, this minor accident was due to my own carelessness—although it would be useful if the instructions supplied with the unit were given in much more detail. A few words about how to start the flow of water into the unit, and a word of warning about possible back siphoning when the lid nuts are loosened, would be useful additions to the brief list of instructions supplied with the unit. Nonetheless, the instruction leaflet does give an excellent diagram of an "exploded" view of the unit, although few of the parts are named. (Spare parts are ordered by number.)

Leaving aside the above comments, the main question is: How well does this expensive filtration unit function? The answer is: Very well. I have had it under test now for several weeks and have found that it does an excellent job in keeping my 30 in. × 15 in. × 15 in. community tank very clean, with excellent water circulation and a very even spread of temperature throughout the tank. I found it necessary to clean out the unit after two weeks' use. The unit has the double advantages of providing mechanical *and* biological filtration—although the effects of the latter are such that they cannot "be seen." The biggest attraction of the unit to me is its virtually silent operation. I have yet to come across a quieter filter of any kind! One could easily eat, sleep and live in the same room as the filter without being aware that it was operating. It gives an excellent turnover of water. (One point I noticed which may or may not be unique to the single sample I have tested is the fact that, on some occasions, when the unit is switched on, the motor can be heard in the room. However, I found it easy to remove this slight noise by switching the filter off at the power point and switching it on again immediately. One or two such switchings invariably resulted in its operating virtually silently.) I would also suggest that the instruction leaflet could inform buyers not to screw down the lid nuts too tightly as it can result in slight cracks appearing around the upper part of the filter body.

It may sound as though I've been a little severe with my comments about this filter, but I feel that such a high quality item merits constructive criticism as well as praise—and one does not lightly spend over £25 on an item unless one is sure that it will work well. The Aqua Joy does work well—very well indeed—and its virtually silent operation will make it very popular with both the aquarist and the members of his or her family. It's an expensive item—but so is a Rolls-Royce. I would say that the Aqua Joy is the Rolls-Royce of aquarium filtration. In the case of my test aquarium the irony is that the filter is probably worth rather more than the aquarium and its contents!

If you have a special show piece aquarium, prominently displayed in your hall, lounge or living room, I suggest that you give careful consideration to the possibility of investing in an Aqua Joy. It's the luxury filtration system for that luxury show piece aquarium!

B. WHITESIDE.

A SPAWNING OF

Labidochromis vellicans

by David R. Smith

I FIRST obtained a pair of these fish in December, 1973, and decided that, as they were full grown, I would attempt to spawn them as soon as possible.

With this thought in mind, I proceeded to set up an all-glass 18 in. × 10 in. × 10 in. tank with the usual well-washed gravel and suitable rockwork.

I chose some slate for the rockwork and one small flowerpot placed on its side to provide a refuge for the female should the male prove vicious, as is the case with many Malawi Cichlids.

I wished to separate both fish in the tank and condition them prior to spawning and to this end I obtained two pieces of plastic angle and an appropriately cut piece of net curtain to stretch between the plastic.

My reasons for making a separator with net and plastic are twofold. Firstly, with a glass separator the temperature in the tank differs due to the fact that the heater is on one side of the tank and the water cannot circulate freely with the separator in place.

My second reason for choosing net is that Malawis are usually very boisterous fish and it is possible for them to injure themselves dashing against the glass in their attempts to reach their respective mates.

My next task was to adjust the water in the spawning tank to suit the conditions that Malawis prefer, i.e., hard and alkaline.

I obtained from my local chemist a tube of Sandocal tablets of the type given to people who suffer from a calcium deficiency. One quarter tablet was added every two days and the DH measured until a reading of 5° DH was achieved. The addition of bicarbonate of soda ensured the pH was on the alkaline side with a reading of about 8° pH and with the temperature at 80°F I was ready to install the fish in their new home.

Labidochromis vellicans

Labidochromis Vellicans is a fish with an overall colouring of a light golden tan and as both fish sport one egg spot, it is sometimes difficult to ensure you have a pair, but I find that only the male fish has an overall bluish tinge and this is a sure way to tell the difference between them.

My fish were duly placed in the spawning tank and their reaction was immediate and at the same time vastly different!

The female, on catching sight of the male, shot into the flowerpot and remained there whilst the male swam up and down the net separator displaying and quivering in a most vigorous manner.

On finding the net prevented him from entry into the female's side of the tank, he proceeded to alter the gravel arrangement in his own side by shifting quantities of it against the front glass. The Vellicans is a fish with a relatively small mouth in comparison to other Malawi Cichlids but this proved no handicap and within a couple of hours he had a slope of 5 in. or so high, extending from the front glass to the middle of the tank and was swimming at the bottom of this slope shifting the odd piece of gravel to his satisfaction.

Whilst all this was going on, the female Vellicans was occasionally to be seen approaching the net and fleeing back to her hideout in the flowerpot should the male approach her.

When, after two days, both fish had settled in their new tank I proceeded to condition them on blood worms, *Daphnia* and flake food. The fishes' appetite for blood worms was almost insatiable and I'm sure my local dealer was going to bed at night in raptures at the thought of eventually earning his first million on blood worm sales alone!

It was at this point in time that my patience was taxed, as apart from occasionally displaying to one another at the separator and some desultory gravel-

shifting on the male's part, the fish were more or less inactive and just when I was beginning to think success was going to elude me, the female commenced to shift the gravel on her side of the tank in considerable quantities.

Twenty-five days after being put into the tank, the female's breeding tube was down ½ in. and I decided to try putting the fish together. On doing so I was rewarded with the sight of the male attacking the female and driving her all over the tank in a wild manner. I separated the fish once more and as I had to go out on business I left them for the rest of the day.

In the evening at about 8 p.m. I checked the fish and noticed the female's ovipositor was down even further than it had been before, so I removed the separator once more and this time all was well.

The male approached and swam in front of the female at an angle of 45° and then quivered his whole body.

The female followed this procedure and laid two eggs whilst the male swam over them and released his sperm. The female picked up both eggs and repeated her previous move this time laying five eggs which she picked up immediately the male fertilised them.

It was at this point I remembered the controversy presently going on as to whether the eggs spots assisted the female to fertilise the eggs in her mouth or whether they were used to help the fish recognise one another in the rather dark and gloomy conditions of their natural habitat.

I had the opportunity of watching the complete spawning of my Vellicans and whilst the female's mouth was often close to the male's egg spot, she at no time mouthed it although, as stated, her mouth was often in the general area of the egg spot.

I will reserve my own opinion of the purpose of the egg spot until I have spawned more Malawis and can compare notes.

When the spawning was over, the female had sixteen eggs in her brood pouch and was resting in her flower-pot whilst the male swam over her as if on guard-duty.

To be on the safe side I removed the male to another tank and left the female to brood her eggs alone.

The positive need for good conditioning of the female now becomes apparent as throughout the whole brooding process she refuses all nourishment and her condition deteriorates as time passes.

There are various accounts of how long the brooding process lasts and my female released her first young on the twentieth day with all the babies out on the twenty-first day. I left the female in the tank for another two days as she still took her young into her mouth at night but by the third day she paid them no more attention and I shifted her to a tank on her own to fatten her up prior to returning her to my main tank.

At the time of writing the young fish are progressing well on a diet of sifted cyclops and fine flake-food and have trebled their size in three weeks to about half an inch.

I hope this account of a Malawi spawning will be of assistance to anyone interested in these truly fascinating fish and will perhaps encourage others to try their hand in the future. Should anyone do so, don't keep it a secret, let us all know about the method used as it is only in this way we will be able to extend our knowledge of these fishes and who knows, with more tank-bred fish on the market the high price of imported Malawis might even come down a bit.

In conclusion, I will say that if you have been thinking of trying to spawn any of the many Malawi Cichlids now available to us, go ahead, because win or lose it will prove to be a very interesting experience and one long remembered should success come your way.

AQUASCAPING

Barry R. James

BEFORE EMBARKING on the setting up of the aquarium, a little thought and planning will pay great dividends. There are certain guide rules which I will elaborate on later but, basically, it is the aquarist's own creation and as such will be judged by observers as an expression of his or her own artistry. Make no mistake, setting up an aquarium, or aquascaping as it is known in the aquarium world, is an art form which, in my opinion, ranks with painting, sculpture, etc., in its complexity and freedom of expression. However, it is not unlike traditional art a static creation for the setting up and initial planting is only the beginning of a cycle and a certain vision and knowledge is required to envisage the final completed work which may only be apparent after perhaps some months or even years.

Before attempting anything, one must have all the materials, both living and non-living, to hand. The first and most important of these is the compost which will be used to cover the base of the aquarium. First are the peat plates. These are compressed blocks of sphagnum moss peat some 11 in. × 4 in. × ½ in. when dry. These are placed on the bottom glass with spaces of ½ in. in between. This space is then filled with a good heavy loam. Hot water (not too hot or you may crack the glass) is then poured over the plates—which when dry act like a sponge—until they are waterlogged. This is then covered by 2 in. of unwashed gravel and a further 1 in. of washed gravel. There should be a gentle slope from front to back with the compost ½ in. at the front rising to 3 in. at the rear. Particle size of the compost can vary between ⅛ in. up to ¼ in. Natural Chesil beach gravel is the usual material but synthetic-coloured silica gravels and sands may be used as a decorative top layer with good effect. Green, red, black, brown and yellow are all natural colours and will not appear garish if used tastefully with rocks of complementary colour.

Rockwork is the most abused and neglected material used in aquascaping whereas the correct and knowledgeable use of rockwork cannot be over emphasised as being the most vital ingredient of a beautiful aquarium. Rocks, apart from their intrinsic beauty, also serve to terrace the gravel and prevent it from slipping. They break the monotony of a plain gravel base, give depth and perspective and, of course, act as hiding places for fishes, thus creating the illusion of mystery and surprise. The earth's crust is composed of many different types of rock but only certain types are of use to the aquarist. Calcareous, such as limestone, marble and chalk, should be avoided as these give rise to very hard water. Mineral-bearing rocks containing metallic ores should not be used as these could be potentially poisonous to the fish. Igneus and metamorphic rocks are mostly suitable and these include granite, basalt, gneiss, quartz and certain sandstones of a non-calcareous nature. Artificial rocks made from fibreglass, treated concrete and fused glass are also suitable. Depending on the scheme one decides to adopt in the layout, the rocks can take the form of water-worn boulders or stratified or sharply splintered pieces. On no account should shells or coral be used in the freshwater aquarium. Rock-pieces are generally used as terracing as mentioned previously and are set in position as shown in Diagram 1. Diagram 2 shows the plan view of the operation. An interesting innovation in creating stratified rockwork is the use of old-fashioned house slates. By filing and sanding down the edges and then piling them one on another, very interesting stratified rocks can be created. Individual slates can be glued to one another if desired using one of the modern non-toxic resin-based adhesives.

Many aquarists, especially those on the Continent, are very fond of using woody material in their layouts. However, these must be of the correct derivation or disaster can result. Fresh roots, logs, etc., contain dangerous acids and substances which will quickly foul the water. Bogwood, driftwood from seashores or the bottoms of rivers may be used as by prolonged submersion the outer layers of bark and softer material has rotted away and the resultant heartwood contains no dangerous substances. Even so, unless specially prepared pieces are purchased, any material must be thoroughly scrubbed and placed in boiling water for a

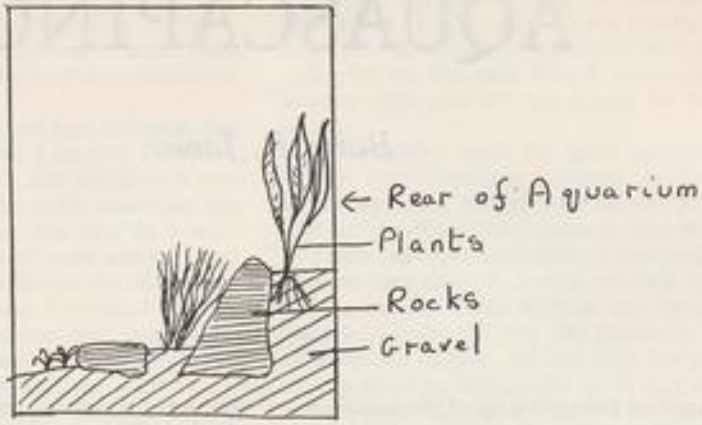


Diagram ① Method of Terracing using Rockwork

time to sterilize it. Willow roots which have been bleached by boiling are also useful as is virgin cork oak. As the latter is the material from which life belts are made it is extremely difficult to prevent it floating. One way is to glue the cork to pieces of house slate and then cover the slate with gravel which then acts as a base-plate.

The next stage is the selection of plants. Confronted with either the meagre choice available at the local pet shop or the bewildering array of the specialist aquatic nurseryman, many aquarists are at a loss to know what to buy. Often he will settle for putting a sum of money on the counter and saying: "Can you do me a few weeds for that?" Let us scotch one fallacy for a start. Aquatic plants are not weeds when purchased for an aquarium even though they may be so in their country of origin. Nobody would dream of going to a garden centre and pointing at a Rhododendron, saying: "I'd like to buy that weed over there!" Yet, Rhododendrons in their country of origin in the Himalayas are probably looked upon as weeds by the local population.

The correct selection of plants for the aquarium is probably more important than that of the fish, yet aquarists continually underestimate the importance of this fact as they feel that they are setting up a fish tank rather than a plant tank. However, in a poorly planted aquarium the fishes do not display their finest coloration partly because of the lack of a feeling of security and partly through lack of contrast of their colouring with the background.

In future articles I intend to deal with the various species of water plants available and will use botanical classification for the purpose of differentiation. Here, however, I shall group plants according to the position they are generally planted in the aquarium.

1. *Bunch Plants.* These species are usually found in

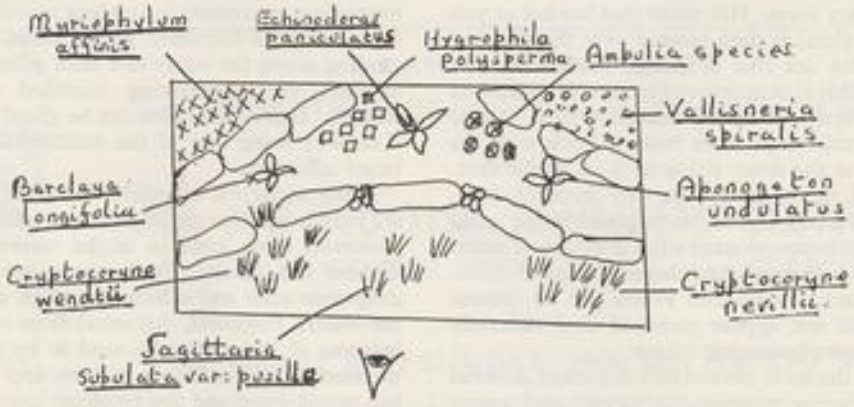


Diagram ② Plan view of a typical arrangement

nature growing in dense stands or clumps. For this reason they should be purchased in groups of five or more plants. They are generally sold as non-rooted cuttings. As rooting normally occurs within four or five days of planting, this need be no cause for concern. Most "Bunch Plants" have no definite limit of growth and are, therefore, situated to the rear of the aquarium. Although perennial in habit, they generally need to be replaced every 18 months or so as after this many tend to deteriorate. The reason for this is that these plants often have two periods of growth. When water levels are high, they grow in a submerged state with soft luscious foliage. During drier periods, however, when the pools and streams begin to dry up, they produce stronger emersed growth and the sexual reproductive cycle, i.e., flowering and seeding occurs. Examples of this group include: Hygrophilas, Cabombas, Elodeas, Rotalas and Sagittarias.

2. *Specimen or Accent Plants.* Generally speaking, these are more expensive. Slower growing than the former group, they have a fairly well-defined limit of growth and are purchased with root systems intact. Planted in the middle reaches of the tank, they are the focal points of the set-up. Examples include: *Echinodoras* (large species), Nuphars, Aponogetons and the larger Cryptocorynes.

3. *Dwarf Plants.* As their name suggests, these are small plants growing only a few inches in height and are, therefore, used in the foreground. Many are slow growing and again relatively expensive.

4. *Floating Plants.* Floating free on the surface, these are generally introduced after the others and provide shade from excess light, refuge for fry and as a spawning medium for adult fishes.

Now we come to the arrangement of the various materials to form what one hopes will be an agreeable combination.

As mentioned previously, the gravel should slope gently from back to front with a depth of 3 in. to 4 in. at the rear to 1 in. at the front. This slope enables excess mulm to accumulate at the front by gravity and is thus much easier to remove. The rockwork is used as terracing to prevent the gravel from slipping and forming a level plain. Thin sections of rock are best and they should be thoroughly examined so that the best face is presented to the observer. Stratified rocks should show continuous lines of stratification as this is how they generally are found in nature. If an underwater stream effect is created—using the outflow from a power filter or a submersible water pump—then waterworn boulders and pebbles should be used. Rocks must be firmly bedded into the gravel and if balanced on top of one another should be glued firmly together as a careless hand dislodging a boulder can have disastrous effects when it cannons into the front glass. Rocks should be set in a half-moon shape as shown in diagram 2. Spaces between them can be plugged with small pebbles or plants. I have generally found it easier to place the plants in position before filling with water. Commence planting from the front, using the dwarf plants in small groups in front of the rocks. Continue to plant the specimen plants and finally install the bunch plants at the rear. If the process takes place in a dry atmosphere, it is wise to sprinkle the plants with water periodically to prevent desiccation. The tank is now filled with water which is at a temperature of 72-78 degrees Fahrenheit. To prevent the disturbance of the plants, a saucer should be placed on an area of open gravel and the water poured gently on to this until the tank is full. Lighting, heating and aeration systems can now be switched on.

If plants have a tendency to float to the surface, a strip of lead wire loosely wrapped around the base will weigh them down until rooting has taken place.

The above process might be described as the classical English way of arranging aquaria, but examples of other aquascapes are illustrated and, of course, the reader will devise some of his own. On the Continent a popular idea is to create biological environments based on which a model is constructed of, say, a fast-flowing stream in S.E. Asia in which all the flora and fauna are indigenous to that area. Stream effect can be created using the extended outlet of a power filter such as a Nuova or Eheim. Using bogwood, an acceptable model of a forest pool in the Amazon basin may also be improvised. Here, of course, great attention is generally paid to the pH and hardness of the water as the intention may be to create an ideal environment for Discus—see article by Eberhard Schulze, *The Aquarist*, September, 1974.

When first purchased, plants often have to be prepared before planting. This entails the pruning of any dead leaves or stems. Root systems, where present, should be evenly trimmed back to clean white healthy tissue. Bunch plants should have their lower leaves removed. When planting a small depression should be made in the gravel and the plant held upright with one hand, the roots evenly spread out and the gravel gently firmed back over them.

If unsightly wires and tubes can be seen through the back glass, a suitably tasteful background—the Genyk model is a good one—can be attached to the rear glass or a coat of quick drying green lacquer applied to rectify the situation.

Filters

The aquarist will find it difficult to make a choice from the massive array of equipment available and it is not within the scope of this article to go into detail on their merits and disadvantages. However, it is generally agreed that, except for a few species, most plants grow but poorly in tanks containing sub-gravel filters unless the gravel layer is very thick and the turnover rate low. In my experience, only a good power filter will do the

job effectively as air-driven types do not agitate the water powerfully enough to move the detritus to the filter inlet.

Cichlid Tanks

Where large cichlids or other robust fish are kept, it is often impossible to grow any plants at all as they are constantly grubbing the bottom and in the case of herbiverous species, the plants will be eaten. In this case, the decoration must be confined to interesting rockwork, woody material and, if desired, artificial plants. Artificial plants can never take the place of the real thing, but in the last few years some magnificent copies have appeared; in particular, the Metaframe range, and in cases where the real thing cannot be used the artefacts can be very realistic. Unlike natural plants, however, they confer no contribution on the biological cycles in the tank and unlike natural plants have no self-cleaning ability and, therefore, must be removed periodically for scrubbing.

FOR THE HERPETOLOGIST'S BOOKSHELF

by Andrew Allen

IN THIS ARTICLE I intend to compare and evaluate some little books that give a painless introduction to the world of Reptiles and Amphibians. They are for complete amateurs, arriving new to the subject. Those experienced in herpetology should pass on, or wallow in gentle nostalgia as they read of the works on which they cut their intellectual teeth.

Gentlest of all is *A Study of Reptiles and Amphibians* by Alfred Leutscher, Blandford Press, 1973. A slim little volume, price about 60p, it nowhere taxes the powers of very young, busy or old. The photos please, the account skims superficially along, and (unlike most others of similar bulk) the readable prose is in clear English rather than half-breed American. Could serve as a child's first book on the subject, but little more.

Amphibians by J. F. D. Frazer in the Wykeham Science Series (1973) may claim to be somewhat more erudite. It covers classification, evolution, anatomy, physiology, ecology and behaviour of Amphibia from the viewpoint of natural history; throughout, the emphasis is upon adaptive relations between the animal and its environment. Though the general level is introductory, a scattering of unfamiliar and fascinating facts ensure that every biologist will find the book of interest. But at £2 for a paperback of 120 or so pages with only ordinary black and white photos, the value is not good. And not many public libraries may yet possess copies.

Reptiles are covered in very different style in *The Book of Reptiles* by R. A. Lanworn, Hamlyn, £1·95. The author was long in charge of the Reptile House at London Zoo; he has produced a volume distinguished by some large and superbly chosen colour photographs. The text does not demand; chapters flit from Reptile variety to morphology, dinosaurs, conservation and the fate of pets. Distinctly lightweight, but good value for cash, it might be enjoyed by precocious youngsters or look handsome by the coffee table.

Less profusely illustrated, but more solid value in terms of information per new penny or per page, is *The World of Reptiles* by A. Bellairs and R. Carrington (1966), Elsevier Publishing Company. This compact little book of 153 pages provides a contemporary account of Reptile biology, slanted towards the different groups, and aimed at readers with no prior experience. The photographs do not meet the most exacting modern standards, but the well-written text should occupy several agreeable hours.

All these books come from the pens of accepted figures in the field. Each is directed towards herpetile biology and natural history, rather than just descriptive cataloguing of endless species. And all should be readily available through inter-library loan, if absent from the local shelves. Few will wish to actually buy them—for any progressive biologist they soon become redundant items on the bookshelf, superseded by growing personal knowledge, giving way to more comprehensive tomes.

To close, I shall offer warning against a book. Newcomers to the field might hear of *A Dictionary of Herpetology* by J. A. Peters, 1964, Hafner, and feel that this could help them in understanding more advanced literature. But few scientists would consider a specific dictionary of herpetology to be very valuable —most herpetological terms belonging to biology as a whole. And the book in question struck me as a dubious hotch-potch of 3,000 items, including such as "dot," "notch," "toadlet," and "lizardlet"! Etymologically confused, I can think of few uses for this book. Save your money. If terminology and jargon confuse, prefer *A Dictionary of Biology* by Abercrombie, Hickman and Johnson or Uvarov's *Dictionary of Science*, both in the Penguin reference book series.

OUR EXPERTS' ANSWERS TO YOUR QUERIES

READERS' SERVICE
All queries MUST be accompanied by a stamped addressed envelope.

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

TROPICAL QUERIES

by Jack Hems

I have a 72 in. by 22 in. by 22 in. steel frame for glazing. What thickness of glass do you recommend?

A glass (polished plate in any case for the front panel) three-eighths of an inch thick would be all right.

I have read in your pages about the inclusion of clay in the growing medium for plants. Is the clay mentioned the clay dug out of the garden or that used by the makers of pots?

The clay advised is the ordinary yellow clay found near the surface or a few feet down in many gardens. Take care that no worms, slugs or dormant grubs are left in the clay before adding it to a mixture of peat and grit.

I have been told that water taken from copper or lead pipes will lead to the early demise of aquarium fish. Is this true?

It is true that metals such as copper or lead in contact with water over a long period of time can be harmful to fish as well as to human beings. Yet water from the domestic mains supply is quite safe to introduce into the aquarium if it is allowed to run away for a minute or two before use. For this slight wastage will flush out the infinitesimal traces of metallic salts which could accumulate in water held in a pipe for several hours or overnight. It is interesting to note that the World Health Organisation lays down the rule that 0·3 parts of lead per million parts of water must not be exceeded for drinking purposes or in the preparation of food. The toxicity of copper in the water is greater. Always there is more danger from water passing through new pipes than from old pipes which, in course of time, become coated on their inside surfaces with a deposit of mineral salts.

I am on the point of setting up my first aquarium. Would you therefore be so kind as to tell me the best grain-size of sand to use for a planting medium?

Use sand about the size of a pin-head or larger. In short, a well-washed sharp sand or fine grit. All reputable dealers sell the right type of sand or grit for the freshwater aquarium.

Could you tell me if rainwater collected from the asbestos roof of my garage would be suitable for filling and topping up aquariums? The roof of my garage has been exposed to the weather for upwards of ten years. I live in a smoke-free zone.

Provided your roof is clear of a large accumulation of bird droppings and wind-deposited debris, then water collected from it will be all right. Be sure, however, to filter it through washed sand or filter fibres before introducing it into the tanks.

Will cross-mating take place between guppies and swordtails kept together in the same tank?

Hybridisation between *Poecilia reticulata* and species of *Xiphophorus* have been recorded in the past, but such matings appear to have been very few and far between.

I have been informed by a fellow aquarist that the best eradicator of *algae* in the aquarium is the plecostomus catfish. Is this correct?

I do not think there is much to choose between species of plecostomus or otocinclus or, for that matter, the fish known to science as *Gyrinocheilus aymonieri*, which is neither a catfish nor a loach but merely a species of tropical with an underslung mouth and an appetite for *algae* growing on the leaves of plants and fixed objects in the aquarium. Yet there is no question that our sluggish old friend called the plecostomus does an excellent job.

I am thinking of starting a tropical tank. What size do you recommend for a beginner? Also, would you please give me the names of some attractive looking and not too rapidly spreading and overwhelming submerged plants?

Purchase a tank no smaller than 24 in. by 15 in. by 12 in. Carpet the bottom with about 2½ to 3 in. of really well-washed sand or fine grit. Then plant it generously with *Cryptocoryne affinis, C. becketti, C. griffithi, C. willisi, Microsorium pteropus* and *Lagenandra lancifolia.*

I have just bought a pair of Texas cichlids. One is about 2 in. long, the other about 2½ in. What is the maximum size of this beautiful fish?

Given plenty of swimming space in well-aerated water, the Texas cichlid may attain a length of about a foot. I hope you know that the Texas cichlid is not suited to sharing a normal-sized aquarium with other fishes: it is always ready for a fight.

Please give me some information on Somphong's barb.

Somphong's barb is known to science as *Barbus* or *Puntius* (according to some American authorities) *somphongsi.* It is native to Thailand and reaches a length of about 4 in. It is active, peaceful, and an eater of greenstuff, so it can be placed in a community tank not stocked with fragile foliaged plants.

Could a lionhead goldfish be kept in a tropical aquarium?

Young (small) fancy goldfish such as lionheads may be placed in a tropical aquarium provided it is a fairly large one and the temperature is not very high, that is about 75°F (24°C). All the same, bear in mind that the lionhead is more at home in a coldwater tank maintained at comfortable room temperature. Further, goldfish are great distributors of the planting medium and uprooters of shallow-rooting plants.

I should like to make a triangular-shaped tank to fit into a corner of our sitting-room. Do you think I should have a steel frame made by a local engineering firm or do you think I could make a satisfactory tank with the necessary pieces of stout glass and a silicone rubber sealant alone?

A steel-framed tank made to your own design will not be cheap. On the other hand, five pieces of plate glass of a suitable thickness joined along the edges with a silicone rubber sealant would not cost a great deal of money and made up properly it would prove leakproof and sturdy.

I have some barb fry which suddenly lost their balance and swam either head down or appeared to struggle to maintain an even keel before they sank to the bottom and died. Please can you tell me what went wrong?

It seems to me that your fry were subjected to an abrupt change in the temperature of the water. Fry, and indeed all mature fish, are very sensitive to a rapid temperature change and react to it by developing swim-bladder trouble.

I should like to keep some large gouramies in my 4 ft. tank. Can you please give me the scientific names of a few desirable species and their maximum size?

Trichogaster pectoralis (8 in. and more), *T. microlepis* (5 in.), *Colisa fasciatia* (5 in.) and *Helostoma temmincki* (5 in. and more) should meet your requirements. *Osphronemus goramy* attains about 2 ft.

COLDWATER QUERIES

by Arthur Boarder

I have just made a pond but have no plants at present. A friend has offered me some of his water lilies but does not know how to divide them. Also when to plant them would be helpful?

Water lilies cannot be divided as one would split up the clump of roots of a Michaelmas daisy or Phlox, by inserting two forks back to back and forcing the roots apart. A very different technique is required. The lily to be treated must be about three or more years old as it should by then have made some off-shoots from the main root-stock. The main stock may be as thick as a child's wrist and from it there will probably be one or two shoots, two or three inches long. These will have dormant leaf and perhaps flower buds showing at the tip and probably a few roots. Break or cut the side shoots off and they are then ready for planting.

As for the time of year for this procedure, I do not think that it matters at what season this is done, providing the ponds are not covered with ice. I know that it is the stated rule to plant water lilies in April, but in my experience it makes no difference at all as long as the root is kept wet and free from frost. During the cold season the lily will be dormant and so it can be removed with no difficulty or fear of loss at any time. It will then start to grow when the water

warms up a little in late April or early May. The usual method of planting is to place the root in a container of old turf or very coarse, stringy loam. The head of the plant is raised on bricks or other material so that it is not far below the surface. However, whatever depth the plant is positioned in the water, the leaves should eventually grow up to the surface, but this may take longer than if the head was nearer the top of the water.

It is usually stated that water plants from the wild should not be used until they have been made free from pests and diseases but one never reads as to the best method for this procedure. What should one do?

In the first place I consider that it is not worth the trouble and risk to use water plants from the wild at all. It is a thousand to one that such plants will hold many and varied pests or their eggs. To introduce such plants into a pond or tank is just asking for trouble. In the *Aquarist & Pondkeeper* each month there are suppliers who advertise a varied selection of

Fish-louse *(Argulus)* greatly enlarged.

water plants and I feel sure that they would be glad to advise on the most suitable plants for your purpose. If you must use wild plants then a recommended method of sterilising is to steep the plants in a pink solution of permanganate of potash for ten minutes or so. Then rinse well before using. Two grains of pot. permang. to the gallon of water has been given as a good solution, but I am rather sceptical as to whether this strength would be sufficient to kill leeches or their eggs. Also other types of eggs such as those of fish lice (*Argulus*) are not likely to be killed by such a treatment.

How does one start to breed Daphnia? **If I buy some from my local dealer how do I isolate the** Daphnia **from any pests and will they be worth breeding as a supplementary food for pond fish?**

I will take the last part of your query first and say that I do not think that *Daphnia* are worth breeding solely for the purpose of feeding pond fishes. They are very good as a food for fry but I think that garden worms are much better for fishes in a pond. To sort out the pests from a bunch of *Daphnia* it is a good plan to put them in a white-bottomed container such as a washing-up bowl. Any pests should then be seen, although one must realise that some of the young of various pests can be very tiny and could escape recognition. Some of the larger pests can be instantly recognised and these include the *larvae* of dragon flies, water beetles, etc., but the young of some of the other pests, when first born, are so small that a good magnifying glass is necessary with which to identify them. Although it is troublesome to sort through a quantity of *Daphnia* it is well worth the effort if one intends to breed from them.

As to the breeding of them, it is well to understand on what they feed so that the conditions which they require may be supplied. *Daphnia* feed on small forms of life such as *infusoria* and *Algae*. It is a good idea to have two containers which need not be very deep, in which to breed the water fleas. Start one off with *Algae* infested water, nice and green from a pond, and add some *infusoria*. The *Daphnia* could live on the *Algae* alone, but as a further food one should encourage a good culture of *infusoria*. This can be made or encouraged by using crushed lettuce leaves or other decaying vegetation. Keep the culture in a good light and the *Daphnia* should soon multiply. Do not start feeding from the stock until a good number are to be seen. After a time it is probable that the *Daphnia* will start to decline in numbers and it is then that the other container will come in handy. This second container should have been started off with plenty of *infusoria* so that it is ready to take a few *Daphnia* so that the culture can be continued.

I am unable to buy Tidmans sea salt as recommended as a cure for Fungus disease. If I use a salt as sold by some pet shop dealers will this do as well?

I see no reason why such salts should not be used. It is the easily running table salt which is not as good to use as this contains a small quantity of *magnesium carbonate*. If you use a proprietary type make sure that you comply with the directions which are supplied. Any large chemist's shop should be able to supply Tidmans sea salt.

I have some plastic trays in which I have planted water plants to stand on shelves in my pond. I now realise that I have no drainage holes in the containers. Are they necessary?

No holes are needed in such containers as these are usually only made to drain off surplus moisture and as the containers are continually in water there is no object in providing such holes.

My pond goldfish spawned last June and I have kept five of the fry which are still in the pond. I propose to put them in a tank and bring them indoors for the winter. What size tank shall I use and need it be heated for the winter and how about feeding them?

I think that your fry will be all right in the pond for the winter. If they have lived until the middle of November without being eaten, they will be safe during the winter in the pond. It is not cold which could kill young goldfish during the winter but foul water. If the water in the pond is pure the fry will be safe. However, if you wish to watch their progress you can put them in a tank, not less than 20 × 10 × 10 in. One of the all-plastic framed ones will be suitable. No heat will be needed as the indoor temperature will be enough to keep the fry gradually growing throughout the winter. Go easy with the feeding, but as long as a small pinch of food is taken immediately, a little can be given each day. In a living room with a temperature of somewhere about 64°F., the fry can grow slightly through the winter and are likely to change colour earlier than they would have done if left in the pond. The usual flake food with an occasional little live food will suit the fish.

Some of my goldfish are suffering from a form of ulceration. A wound appears on a fish and it gradually increases in size. The fish appears to be in good health otherwise. I have tried potasium permanganate with no effect. What do you suggest?

It was not stated whether the affected fish were in an outdoor pond or a tank. It would be of great help to me in answering queries if more information was given, otherwise I am rather working in the dark, and I can only surmise what the trouble really is. If one has a complaint and goes to a hospital for treatment, numerous tests are taken and the doctor has the advantage of being with the patient. If only I was told if the fish in question are in a pond or tank, the size of the pond, number of fishes and their sizes, what food is given, what plants are in the water, whether any fresh fishes or plants have been introduced and if any live foods have been given. Then the trouble from which the fish is suffering will help me to make a diagnosis, but naturally with little information I cannot be expected to be correct every time. The wounds on your fish could have been caused by pests such as the *larvae* of one of the predators, such as dragon fly or water beetle. Also fish lice (*Argulus*) could be responsible. There is a disease of an ulcerous type known as *Haemophilus piscium*, which causes ulcers and if this is the trouble it may be cured by dabbing the sore with a strong solution of T.C.P. or Dettol. The affected fish should be held in a wet cloth and the wound dried as much as possible with a soft rag. Then paint the wound and keep the fish from the water for a few minutes. One expert recommends treatment for this disease as adding 50 mg per kilogram of fish to the food every day. Personally I think this very complicated and suggest my proposed cure first.

I have been given a small pond and have set it up in the garden. I am wondering if I should stock it with Koi and if so what would they cost?

As your pond is a small one I do not think that it would be wise to stock it with Koi. I know that they are very popular at the moment but you must realise that they can grow very large and so would soon outgrow your small pond. As for the price, this varies with the size or if the fish have been bred in this country when they could be cheaper. They can cost from £1 to £20 or more according to size and colour. I suggest that you forget about the Koi and get a few shubunkins instead. Many of these can be as colourful as many Koi and they are not as difficult to keep over the years. They are also much cheaper and will not grow too large for you in twenty years. Also they are not as particular as to the purity of the water and need never have any form of filtration in the pond.

I have a pond of 12 ft. × 8 ft., and of varying depths and have a number of fishes in it. For four or five years the goldfish did not spawn at all and yet this year they have spawned five times. Can you explain why?

It is quite obvious that the conditions in your pond suited the goldfish this season better than in other years. It is quite impossible to say why goldfish spawn, but it is much easier to say why they do not. To encourage a spawning, the water must be in good condition, that is have a good supply of oxygen. Goldfish rarely do so when the water is foul. The weather can make a difference as well and it is not always the sunniest days which tend to make the goldfish spawn, as I have found that they are not as likely to spawn when the temperature of the water is over 70°F., as they will do when it is in the lower sixties (F). Over many years I have found that the average temperature of the pond water when spawnings have taken place is 61°F. In any case you have no

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VIEWPOINT

by A. Jenno

EXPERIMENTS which are being conducted at the Fish Culture Unit of the University of Aston in Birmingham into the metabolic processes of Rainbow Trout living in salt-water have necessitated the development of a closed-circuit environmental maintenance system which may be of considerable interest to aquarists wishing to keep quantities of fishes in minimal water volumes. The system was designed by John Roberts of the University's Department of Biological Sciences in order to allow the recirculation of expensive synthetic salt-water under more or less stable conditions as an alternative to the more usual method in fresh-water experiments where the water is simply dumped to a drain after passing through a system only once.

Figure 1 shows a layout of the complete set-up. A header-tank (A) supplies water via a ring main (B) to six fifteen-gallon round tubes (C) which contain the fishes. Each fish container has a constant level overflow device, and is fitted with a faecal filter (D) which removes heavy wastes. An enlarged diagram of these last two components is given in figure 2. The output water from each faecal filter is then fed into a large biological filter (E), and from there is pumped back up to the header tank by water pump (F) and through a spray pipe (G). The header tank is fitted with an automatic overflow (H) which dumps excess water directly into the biological filter, which itself has a similar overflow (I) to dump water to a drain when necessary. The whole system contains about a hundred and eighty gallons of water which is circulated at a rate of about two hundred and forty gallons per hour. Each fish container has a population of 20 five-inch trout. Temperature control is carried out in the header tank.

The system works well and has been in use for some time. A simple calculation will show that a stocking density of nearly seven fish-inches per gallon is achieved in the fish containers, which experienced aquarists will appreciate is pretty good going in salt-water. John Roberts maintains that this could even be increased if required. Due to the very high rate at which a trout's metabolic processes operate and the fact that the biological filtration system only deals with nitrogenous waste products, it is found that the levels of dissolved organics present do make some periodic water changing advisable, in this case in the order of fifty gallons per week, but it is felt that with less active fishes in a freshwater environment and the use of an additional activated carbon filter to adsorb the dissolved organics, then this figure could be considerably reduced. Also it can be seen that in this particular system there is as much water again in the auxiliary components as is present in the actual fish containers so that it might be argued that the true stocking density for the whole process is half the figure given above. Again with less active fishes with lower metabolic rates it is probable that more fish containers could be included without increasing the auxiliary capacity, and that the existing containers could hold more fish-inches. The water circulation rate could also possibly be reduced. Thus the system should be applicable to the growing-up of quantities of the hardier home-bred fishes and could have considerable advantages over the use of numbers of independent aquaria, each with its own environmental control methods. It would seem to me that a smaller header tank capacity could be managed and that a reduction in the biological bed depth from the present twelve inches could be tolerated if essential. The one inch layer of crushed cockle shell used to buffer the pH value of the salt-water would be omitted in most freshwater systems.

Feeding is by pelleted trout food, similar to "Pond Pride" or "Promin," at a rate of about two grams per day per one hundred grams of fish body-weight in three feedings. It might be thought that the fast water circulation rate of about thirty gallons per hour in each fish container would mean that the food might be swept away before the fishes have time to eat it, but I am told that this does not happen with trout because they are so greedy that anything given is taken immediately. With less voracious fishes it might be advisable to switch off the water circulation for a short period at each feeding.

Maintenance of the system consists of periodically raking over the filter bed surface to prevent caking and flushing the resulting debris away, and the cleaning of the faecal filters as required. Nitrite tests have been carried out and have shown satisfactory results, but it is not thought necessary to repeat these as a routine. The system then obviously suggests itself to those keeping quantities of small fishes in closed systems. Some modifications to suit the characteristics of individual species would be advantageous as already suggested above, and with care and attention it should be possible to devise a satisfactory system to suit any

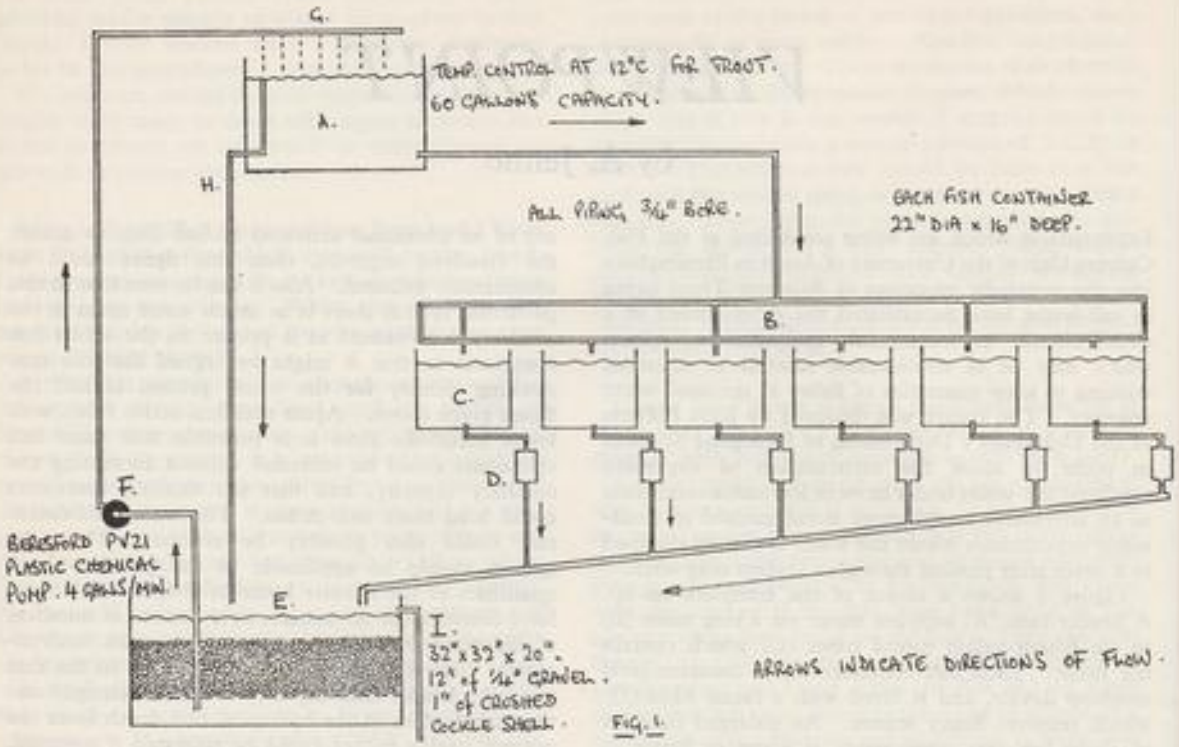
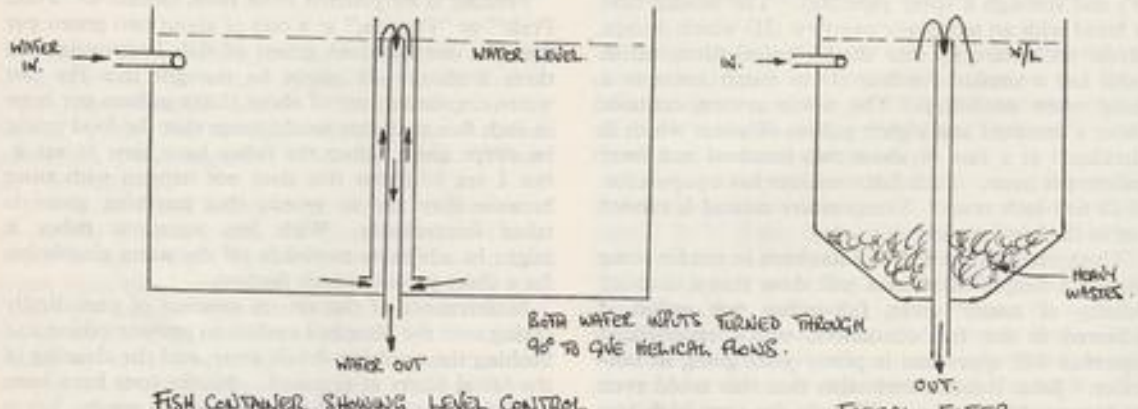


FIG. 1.



FISH CONTAINER SHOWING LEVEL CONTROL.

FAECAL FILTER.

(ACTUALLY MADE FROM LARGE GLASS BOTTLE WITH NECK + BASE REMOVED)

FIG. 2.

of our common home-bred species. For those interested enough to build such a system, other details are given in the diagrams which should enable either an exact copy or a scaled version to be constructed. The use of round tubs as fish containers is not of course essential, although there are benefits in having the water flowing through the containers in the helical pattern achieved here. It should be noted particularly that the method of extracting the water from each fish container from the floor by means of the Koshihara-type fitting ensures that all wastes are satisfactorily removed.

Birmingham aquarists might be interested to know that in other experiments at the Aston Fish Culture Unit, researchers are keeping very large populations of trout in very crowded freshwater containers where the water is only used once, and it is found that it is not necessary to carry out any prior treatment of the water before use, except for chlorine removal, as it is so ideally suited to aquatic life. It is thought, however, that its fish-keeping qualities may deteriorate more and more in the future as larger quantities of water from the Severn are mixed into that from Wales.

Over the last few months I have been gradually converting my brick garage into a fish-house. Not, I hasten to add, completely along the lines of my article on quantity fish-breeding in the November issue, as I do not have the time for that kind of exercise nor the dedication to commercial priorities or the necessary physical stamina either, but as a more enjoyable facility which I hope will still pay its expenses and be educational as well. Many of the features discussed in the previous article do, of course, apply, namely the recommendations for insulation and electricity supply and other services. The building is now part-operational in that it has two walls of the four available occupied by aquaria, and the differences and improvements to my fish-keeping methods are apparent already. All my previous aquaria have been house-bound so over the years I have had to develop a system of maintenance which involved minimum water changing and other cleaning, because of the inconveniences of transporting buckets of water about or running hoses through the house, and have had to give maximum attention to not splashing the carpets and furniture and therefore have generally left the aquaria alone as much as possible. This of course has many disadvantages including the fact that many species of fish suffer in one way or another from lack of proper attention in such home aquaria. However, this did not become really obvious until the fish-house facility was finally obtained. How nice it is to splash a bit of water about without worrying overmuch, and how convenient to have a handy tap and drain in the same room. Former troublesome routines are now a pleasure and as a side benefit my house now seems rather roomier without the fifteen aquaria and associated equipment which have been moved out. Several interesting little points have arisen during the installation exercises which may be worth discussing.

The water supply was obtained by branching off from the feed pipe to the upstairs toilet cistern, and was brought through the outside wall and then dropped down to the garage, which is situated slightly behind the house. A stop tap was fitted inside the house to do away with the need for outside insulation of the piping, the idea being to shut off the supply and then to drain the piping via the fish-house tap in periods of cold weather. All very nice except that it didn't work. Once the stop tap is shut off the water in the piping does not fall because there is no pressure upon it, or to put it another way, the water tends to create a vacuum inside the pipe at the top which holds it up and stops it falling out. To overcome this problem a friend came up with a very clever idea, although it makes things a little more complicated. I now have another tap in the main pipe which feeds both the toilet cistern and the fish-house supply. This is shut off, the other two taps are opened, and the toilet is then flushed. When the cistern empties there is then no replacement water available and the cistern filling valve is automatically open, so air enters through this and eliminates the vacuum at the top of the fish-house supply pipe. This pipe then empties and its own stop tap is shut off while it is empty. The main tap can then be opened and the supply restored to the cistern. The fish-house tap can then be shut off and the whole line will remain empty until the next period of use, when the indoor tap is simply opened.

Another point has to do with the installation of large aquaria on a common stand. My one angle-iron stand is about ten feet long and comprises two shorter three-tier stands bolted together. It was practically impossible to set it up level on its six feet before fitting on the aquaria, so I had to do the best I could and hope that things would turn out reasonably well. The first aquarium on was a four-foot all-glass one, made of three-eighth plate, so bearing in mind the well-known recommendations for care in the installation of such aquaria I intended to stand it on a layer of polystyrene to reduce stresses on the bottom glass sheet by the absorption of any irregularities present. In the event there was not a large enough sheet of thick polystyrene available, and so being impatient I used five strips, each about three inches wide and one inch thick, placed across the stand width and equally spaced along the aquarium length. The aquarium was then lifted on to these and slowly filled up. The whole point is that as it filled up it levelled itself by squashing some parts of the polystyrene supports more than others. The aquarium is now perfectly level even though the stand beneath it is not. Another aquarium which was installed on top of a complete

sheet of polystyrene did not level itself, presumably because there were no air spaces for the polystyrene to expand into when the weight of the filled aquarium tried to squash it. I now stand all of my large aquaria on strips or blocks in this way and find that as long as the gravel, etc., inside is evenly distributed and the water put in slowly, then they invariably level themselves up. The polystyrene pieces which are most squashed go down to about a third of their original thickness so quite large errors can be compensated for, although every effort should of course be made to get the installation as correct as possible before relying on this idea.

Another feature which is most essential in any fish-house is the complete use of cover glasses on all aquaria. So many aquarists just do not bother with these and many an otherwise useful set-up is degraded by their omission. Cover glasses keep the water and the fishes in and dust and other rubbish out. Small live food cultures such as micro-worms can be stored on them and will benefit from the rising warmth from the aquarium. Total heat losses will be reduced. The main advantage, however, is that a far dryer atmosphere is obtained in the fish-room. At a high ambient temperature, any increase in humidity will create uncomfortable and even unhealthy working conditions, whereas warm but dry ambient conditions are quite manageable by comparison. As an illustration of the effectiveness of cover glasses in keeping out dirt I find that whenever I sweep the present concrete floor (which is never really dirty) there is always a layer of dust on the covers afterwards, which would otherwise have gone into the water.

Covers for all but the largest aquaria can be made of quite thin glass, certainly not heavier than 32 oz., and on long aquaria with supporting ledges it can be fitted in two or three parts so that only one section need be raised for feeding. Corners can be cut off very easily with a decent glass-cutter so that access is made for cables and air pipes, and if carefully done then more or less complete cover should still be available. A glass marble stuck on with silicone sealer makes a good lifting knob. Cover clips are advisable where the aquarium frame is of painted angle-iron, but I always fit them on to the aquarium frame and not the glass and lay the glass on top of them so that the inevitable small air gap is horizontal instead of vertical. This method also avoids having to cut the glass to fairly precise measurements. Alternatively, small blobs of silicone sealant can be put on the underside of the glass to act as supporting "feet" after drying.

B.K.K.S. NEWS

The members of the Northern Section of the British Koi-Keepers' Society again provided and staged an attractive Stand at the British Aquarist Festival, Belle Vue, in mid-October. A pond containing large Koi was backed with a Japanese-style mural, cut-out model Koi and an array of conifers, all illuminated by coloured spotlights. As in previous years, Northern members were available to give information to the general public who were fascinated by the Koi.

At the London Aquarium Show, hundreds of people visited the Society Stand, centred around a large pond containing a variety of Koi, which was provided and manned by willing members from the Home Counties.

The Society's 4th Autumn Meeting was held at the Royal Horticultural Hall on Sunday 27th October 1974, during which Mr. Roland Seal spoke about his recent trip to Japan made to finalise arrangements for the Society's tour of Japan in April. Many slides were shown to illustrate all aspects of Japanese Koi-keeping, as well as the beautiful places to be seen during the 16-day visit to the Far East.

Mr. Eric Allen, the Chairman, showed a selection of slides of his own methods of pond construction, water-changing and filtration, for the benefit of new Koi-keepers.

There is ever-growing interest in keeping Koi and anyone requiring details of membership should contact Mr. D. C. Davis, 137 Gayfield Avenue, Brierley Hill, West Midlands DY5 2BX.

For details of the forthcoming visit to Japan, please contact Mr. W. R. Seal, 7 Highlands Road, Offerton, Stockport, Cheshire SK2 5HU. Telephone: 061-483 9075.

Message from Dr. Takeo Kuroki—by hand from Mr. S. Kamihata—1st September 1974.

Mr. E. A. Allen,

It is my great pleasure that for the first time I write to the Chairman and the members of The British Koi-Keepers' Society.

It was a few years ago that information of your Society was made known to me by the Shumposha Publishing Co., who publish the magazine Rinko for our Society, Airin Kai. At that time, we had no previous knowledge of your Society, but since then we came to know more from Dr. Masayuki Kawaguchi, a member of our Kyoto Branch who advised me earlier this year by letter, and from Mr. W. R. Seal with whom I exchanged opinions on the phone during his stay in Japan.

Mrs. Hilda Allen, P.R.O. of The B.K.K.S., with Mr. S. Kamihata.

Today, we would like to present copies of our magazine Rinko, to you through Mr. Sigezo Kamihata, and we hope you will note the articles of introduction on your activities in Great Britain as given in volumes Nos. 77 and 79.

We were much surprised to know that your Society was already established and organised, as there has been little instruction and assistance from Japanese people, and to know how enthusiastic your members are in Koi-keeping.

When I visited California last year, I was also surprised to find that so many Americans love Koi and that an American Koi Keeping Society existed. However, we are more surprised at the people like you who love them so much because you do not have the same historic connections with Japan.

The Japanese Koi-Keepers' Society, Zen Nippon Airin Kai, is the biggest organisation of Koi lovers in Japan and has 8,000 members, with branches abroad in Los Angeles, San Francisco, Hawaii, Korea and Taiwan. All our members are pure amateur and we have the magazine Rinko, published for Japanese readers only, but in the near future when regular subscribers exceed 1,000, we are prepared to publish Rinko in English. If you are interested in the Japanese Rinko, we are willing to send this at a cost of 9,000 Yen, about £13 per year as from April to the following March.

Our Society is supported by a group of businessmen, and Mr. Kamihata, the bearer of this message, has been a leader of this group since it was established. He is one of the most important founders of our Society, and he is the President of a large Koi breeding company.

Having heard that some of your members are visiting Japan next spring, we shall be glad to welcome you through our Branch network in each Prefecture of Japan, and look forward to meeting your members here.

I am sending my message to you hoping to develop friendship, and to be able to exchange opinions.

With best regards to all your members,

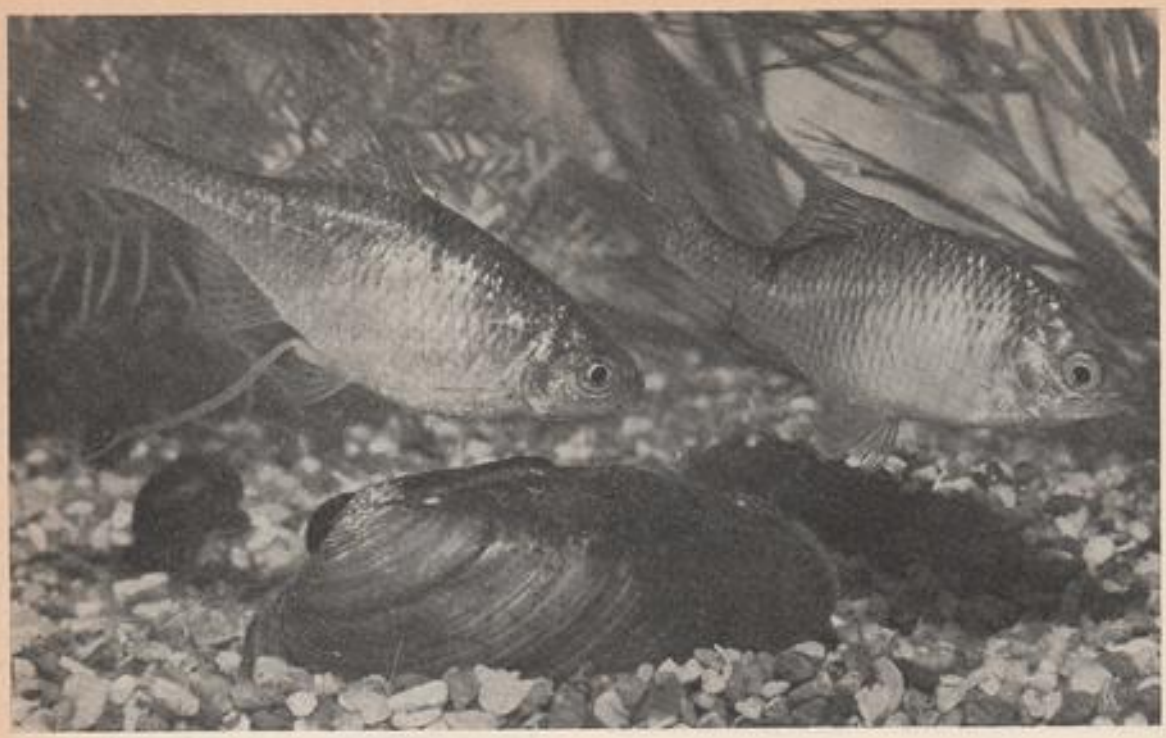
Yours sincerely,
Takeo Kuroki,
President of the
All Japan Koi-Keepers' Society.
(Zen Nippon Airin Kai).

COLDWATER QUERIES (*continued from page* 394)

cause to worry when your fish spawn but could do so when they do not.

Having kept tropicals for some years I thought I would like to try with some fancy goldfish. I asked my dealer and he told me that I should need hardly any compost in the tanks, that I should need a filter, that the fish would munch the plants away and that fancy goldfish are not easy to keep. What is your opinion of these remarks?

As you intend using a tank 48 × 12 × 12 in. and another 53 × 12 × 12 in. in which to keep your fancy goldfish, I consider the information given to you as a "load of old cobblers!" Fancy goldfish are easier to keep in tanks such as yours than many tropicals. Without some base compost the plants would not grow and a filter is quite unnecessary. If you use the right kinds of plants and feed the fish properly, they will not munch all the plants away. I have kept fancy goldfish in tanks for the past twenty-five years without a break and have never used a filter nor aerator. I never lose a fish or have one ill. I do have to move fish on to the garden pond occasionally when they grow too large, but if one knows how to feed and manage, it is surprising how long one can keep such fish as fantails in a tank before they grow too large. Fancy goldfish will give no trouble at all as long as no pests are introduced from the wild along with live foods and water plants. The same goes for the various diseases they could pick up. With a weekly servicing, the tanks will function for years and years with no trouble at all.



BITTERLING BEHAVIOUR

by L. E. Perkins

"THE LOVELIEST and most interesting of European freshwater fishes, very well suited to the domestic aquarium and in its beautiful coloration at spawning time excelled by few exotic species." So says Sterba of the Bitterling (*Rhodeus* spp.) in his *Freshwater Fishes of the World*. These are sentiments readily endorsed by anyone who has kept these fascinating enigmas of the fish world but such aquarists seem to be few in number. Certain it is that successful spawnings and subsequent rearing of fry are either non-existent or unrecorded.

To any aquarist interested in unusual and unique spawning behaviour among fishes, the Bitterling clamours for attention. A coldwater cyprinid from Central Europe, this little carp (8 to 9 cms. in length) is undemanding and requires no other stimulation to commence courtship in the spring than the presence of a mate and one or two specimens of the painter's mussel (*Unio pictorum*). Compost to a depth of 3 cms. is also necessary to give the mussels a foothold. Liberal feeding with live food will help condition the bridal pair and the intensification of the male's colours soon alerts one to the imminence of courtship but while attention is naturally drawn to the male as he assumes his gaudy apparel, it is easy to overlook the appearance of the female's ovipositor which daily increases in size until approximately 7 to 10 centimetres in length.

Both sexes will next be observed paying repeated visits to the mussel(s) and taking up head-down

Above: Male and Female Bitterling examining siphons of mussel.

Below: Female a split-second before making contact with mussel's siphons. Bent-back ovipositor is clearly shown with extremity trailing to left.

positions above the mollusc's breathing siphons as though trying to peer inside them. These examinations are repeated many times and then one becomes aware of increased interest and excitement on the part of the male displayed by much trembling as he assumes an almost vertical head-down posture over the mussel's siphons. His tremors suddenly cease and he dives down and levels out almost brushing the mussel. This operation is repeated and repeated until the female's interest is sufficiently aroused, it seems, for her to adopt a similar position above the mussel. She, too, then dives down suddenly upon the mussel but does not level out without making contact. Rather does she execute a deliberate belly-landing squarely upon the mussel's siphons although when first witnessed it appears to be a clumsy attempt to imitate the male's "near miss."

The pair's alternating attentions to the mussel continue over several days (with occasional breaks to explore the tank for food) and the watcher is able to

follow the pattern of events although some are so quickly executed that their precise nature is difficult to observe.

It is easy to conclude the apparently obvious from a cursory examination of a mussel and a pair of Bitterling in breeding condition. Female fish develops ovipositor which is sucked into the mussel's inhalent siphon so that the eggs can be channelled into the breathing chamber and fertilised by the inhaled milt of the male fish which he has expelled above the siphon. There are several species of *Rhodeus* and it may be that one or more of them behave according to the above logic but the species observed (reputedly *R. amarus*) exhibited quite different behaviour on the part of the female as described earlier. At no time did she dangle the ovipositor over the inhalent siphon and then permit it to be sucked into the mussel and at no time did she stiffen the ovipositor and thrust it into the siphon. At all times, with ovipositor trailing away to one side, she dived with considerable force upon the mussel, the base of the ovipositor coming into violent contact with the mussel's siphons.

Several observers of this behaviour on the part of the female have described the structure of the ovipositor and referred to a short auxiliary tube joined to the ovipositor where it leaves the belly and which is connected also to the oviduct. This, they suggest, is thrust into the mussel's inhalent siphon (along with the elbow formed by the ovipositor which is bent out of the way. The accompanying photograph shows the bent ovipositor and the short sub-organ about to enter the *exhalent* siphon.

While carrying out these observations and filming the various stages, the occasional egg was seen to be ejected by the mussel's exhalent siphon and several more were found among the compost surrounding the mussel. Whether these were all rejects on the part of the mussel or whether some were the result of bad marksmanship during egg deposition is a matter for conjecture but the presence of the eggs serves to prove that the mating was partially successful, no fry appearing subsequently as a result of the union to set the seal of complete achievement on the operation.

When successful fertilisation of the eggs occurs within the mussel, the egg remains safely incarcerated until the fry hatch when they are expelled via the exhalent siphon. It is widely believed that when they leave the mussel they take with them tiny *larvae* of the mussel clinging to them and are so able to disseminate the young of these sedentary molluscs. This symbiotic factor has not been proved which is a pity for it would be satisfying to know that such an intriguing partnership was rounded off with such equity.

READER'S LETTER

Lament of Champions

Quote.—"Confirmed as the most important event of the Aquarist Calendar and as one of the principal attractions at the B.A.F."

Is it therefore to become the obituary of champions through lack of proper filtration and air? Or is it beyond the B.A.F. to ask the traders to provide this on an advertisement basis. Also, could they not award a diploma to *all* who support this grand championship by bringing their fish to this show, and if it's not asking too much, a pass to those entries, so they don't have to pay each day to enable them to look after their fish? The above are not written to pull down in any way this, the greatest championship for any aquarist, but are observations of many who have supported this championship and would like to do so for many years to come.

I would further like to add that this letter does in no way imply anything against the stewards of the Champion of Champions because this year and in all foregoing years, they have gone out of their way to be helpful and I would just like to say thank you.

GEO. T. LIDDLE,
F.B.A.S. Judge,
2 Cromer Avenue,
Gateshead, NE9 6UJ

WITH APOLOGIES TO 'UNO PRODUCTS'

With reference to an article which appeared in our October issue, UNO Aquatic Products have requested us to point out that there is no direct connection whatsoever between their business and that of the well-known West Country firm of Singleton Bros.

We have also been asked to make it clear that their own combined heater/thermostat which retails at £1·80 plus V.A.T. operates on the principle that when the heater is in operation, the neon light on the thermostat is "on," and this indicates that current is flowing to the element. The instrument is supplied with a twelve-month guarantee and should the unit warrant free repair the entire cost is refunded.

It appears that certain statements in the article referred to were misinterpreted and we offer our sincere apologies to Messrs. UNO Products for any inconvenience they may have suffered as a result.

From a Naturalist's Notebook

by Eric Hardy

FROM TIME TO TIME coroners' juries return a verdict of accidental death where someone ate another of our poisonous aquatic plants, a sad reflection on our educational system which turns out people well versed in historical dates and algebraic equations they never use, but ignorant of the land they must live in. "Killer Salad" were October's headlines to an inquest after members of a religious sect prepared a salad with leaves of hemlock water-dropwort, from which one died. They ate it because it was "rather like a parsnip, juicy and quite attractive."

The simple rule is that if you cannot identify a plant, do not eat it. Most umbelliferous plants growing in wet places are poisonous in all their parts, especially when flowering—even unblanched wild celery, common in riverbanks around estuaries and ancestor of the garden plant. An umbelliferous plant has a bunched head of tiny whitish or yellowish flowers, whose stalks all come from the same point, like stays of an inverted umbrella, with a ring of tiny, leaf-like stipules around their origin. A St. Helens, Lancashire, schoolboy died some years after eating roots of hemlock water-dropwort, while three children died of it in Barrow in Furness, the third fatal case from this plant in 10 years. All members of the buttercup family excepting water-crowfoot, but including marsh-marigold, contain poisonous alkaloids at flowering time. Lesser spearwort and the acid celery-leaved buttercup of dykes and marshy places sometimes upset farmstock if fed dried with fodder. These poisons are to protect plants from grazing animals, which usually avoid them by their smell.

Cowbane, a waterside relative of hemlock water-dropwort, is a virulent cattle-poison. The spearworts are probably not fatal to humans, but they often produce rashes when handled by tender skins. Forty-five per cent of cases from eating hemlock water-dropwort proved fatal, when stomach-pumps, emetics and purgatives were too late.

In *The Lancet* in 1937 (p 458) I gave an account of British plants causing medically recorded deaths, which is different from the popular listing as "poisonous" many plants which are only upsetting or rash-producing. Strong-smelling water-dropwort or cowbane's tuberous root contains three poisons—the alkaloid cicutine, oil of cicuta, and bitter, resinous cicutoxine. The bitter yellow sap of its stem leaves and root, at first colourless and blistering, turns yellow on exposure to air. It is mostly in east counties. The plant is fatal fresh or dry, but most strongly in the fresh growth of spring, least in the drying, dying plants of autumn. They can be fatal with a few minutes' or a few hours' illness, according to the victim's stomach being empty or full. The toxic principle is absorbed in digestion. Symptoms include giddiness, salivation, vomiting, dullness, rolling eyeballs, convulsion and usually unconsciousness before death. The alkaloid must be removed with a stomach-pump with all speed; success depends upon the speed in which the stomach can be emptied.

Marsh-marigold and globe-flower contain a caustic property in their tissue (though unopened buds were once pickled as a substitute for capers). The acid sap of spearworts produces vomiting when swallowed, and small amounts were once used by herbalists for this purpose, while Scottish peasants used it for raising blisters. Even the odour inhaled from bruised leaves of hemlock water-dropwort produce giddiness. People have foolishly mistaken its roots for small parsnips. The seeds of stout, fine-leaved water-dropwort or horse-bane, common around the Norfolk Broads, are potent and produce severe giddiness.

Succulent fool's watercress, *Apium nodiflorum*, a waterside relative of celery, thick and succulent, is more irritant than poison. Its flowers are in umbells, whereas true watercress is a crucifer with flowers of four spaced petals. There are many poisonous dry land plants, too.

Incidentally, London Natural History Society adds a new London area record of carnivorous bladderwort, from Kent, its only previous record south of the Thames being Runnymede. Surprisingly at least eight pages in my copy of the new 1974 *London Naturalist* are unprinted blanks, losing all their text, primarily a fault of the printers and surprising that they were sent out like this.

Aquatic plants give more trouble as weeds. Water-hyacinth, a choice for English garden-pools, is a pest in the famous nature-reserves of Florida. Though the herbicide 2,4-D has been banned from use in moving water in the U.S.A., an exception has been made where army engineers were permitted to use it in St. Johns River downstream of Lake Washington, to control water-hyacinth. It was stopped before November when manatees appear in the river and feed on water-plants. Meanwhile, 500 alligators ranging

from 2 to 7½ ft. in length were transplanted from Marsh Island, Louisiana, where they had increased since the 1963 ban on alligator-hunting, to Arkansas and Mississippi in a conservation scheme. Louisiana's state governor asked that these reptiles be removed in the southern parishes of Cameron, Vermillion and Calcasieu and reclassified as "threatened" in their other southern marshes. Meanwhile, the U.S. wildlife service is studying the status in Carolina, Georgia, Florida, Alabama, Mississippi, Texas, Oklahoma and Arkansas to see if any areas should be reclassified, or removed entirely from the protected list.

Aquarists soon appreciate the influence of water temperatures on the distribution of plants, *daphnia*, fishes and most life in lakes. How this varies in time and space is not so well known, hence my interest in Carr, Moffett and Gannon's 143-page newly published technical account of *Thermal Characteristics of Lake Michigan* 1954-5, just received from the U.S. Bureau of Sport Fisheries and Wildlife—124 of the pages are graphs and tables showing how the lake gained heat from mid-March to mid-August and lost heat over the rest of the year. Most of it applies to lakes over here. The warmest surface temperatures were during late July and early August. The lake began to absorb heat by mid-May, but there was great variability in the surface temperature caused by the weather and by thermal transport in the lake.

Upswellings, caused by the driving force of wind, also cause summer variations in surface temperature, occasionally as much as 21°C drop in 10 days. Inshore waters cool faster than offshore in autumn, reaching a yearly minimum in March. The rate of warming in summer is also faster near shore than offshore. Upswellings are also caused by the general circulation and internal waves, a clockwise rotation of open lake current in summer, being separate from inshore currents which are parallel to shore. Very big upswellings are caused by counter-clockwise movement of a temperature-front at water intakes. The deeper the lake, the colder and more stable the summer stratification, and some fish, like char, seem dependent upon this.

Once considered extinct in Britain, the medicinal leech still exists in a few Cumbrian tarns east of Windermere, ponds in Wales and western Scotland and as recently as 1947 was found in a woodland pond on the edge of London, at Bookham Common. It is the only British leech to attack humans, as well as fish, insects, frogs and various worms according to its age. Because of an anti-coagulent exuded by these creatures, a wound bleeds for an hour or two. They are still abundant on the Continent, from Spain to Bulgaria, and in the remnants of Palestine's Lake Huleh. They sometimes attack the throats or lips of farmstock drinking from field-ponds. They are still used officially in medical treatment in this country, hospital teachers tell me. Marine species of leech are parasitic on fish, and a new genus and species, *Arctobdella branchiarum*, was found on long rough dab off Iceland the other year.

Alfred Leutscher's recent book on *Epping Forest* (David & Charles £4·95) has a short, disappointing chapter on its waterways and ponds, noting that the Lea Valley reservoirs teem with *daphnia* and are well stocked with carp, roach, pike and bream. Over 100 forest ponds are also artificial, with 150 rotifers listed, though the crested newt is becoming rarer. Am I to assume it has no snakes?—they aren't mentioned. Surely some more interesting pond-plants merited mention?

NEWS RELEASE

INSTANT OCEAN(r) Synthetic Sea Salts are now being packaged in bright new 3-colour bags in keeping with the company's complete "new look" change for all products and promotional pieces, it was announced by Aquarium Systems, Inc., Eastlake, Ohio.

In bright green, blue and white, the new-design polyethylene bags are also made of heavier gauge material to lessen the chance of damage during shipment or on the shelf.

INSTANT OCEAN(r) Synthetic Sea Salts, which require only the addition of ordinary tap water, are claimed to produce a medium in which marine life will best thrive. They are bagged in 5, 10 and 25 gallon sizes for convenience of the newly-filled tank as well as for water replenishment. Bulk packing also available in 100 and 300 gallon packages.

For information, write Aquarium Systems, Inc., 33208 Lakeland Blvd., Eastlake, Ohio 44094.

FEEDING YOUR FISH (2)

by R. J. Davis

(c) This group contains plant foods. These foods are not fed very much by aquarists, but they are very easy to prepare and provide a necessary balance of vitamins and minerals in the diet. Even carnivorous fishes such as piranhas like some plant foods as well as the usual mollies and catfish that are normally associated with plant foods. Suitable plants would be cabbage, peas and lettuce. These should be boiled for a few minutes until soft. Then small pieces can be fed. The outer shell of the peas should be removed and the inside only be fed. Feeding plant foods to vegetarian fishes often inhibits their innate proclivity of eating plants growing in the aquarium. Cases where feeding plant foods causes fish to start eating the growing plants are few and involve single fish.

(d) Contained in this group is the source of protein that very few aquarists take advantage of. This is, of course, meat; for example ox heart or lamb's heart; this meat should constitute the bulk of the diet. Even vegetarian fishes do well on this food. It is the use of this food in large amounts that allows fishes to attain their full size. Eight ounces or more of heart can be bought ready frozen from the butcher and this can be stored in the freezing compartment of the refrigerator or in a deep-freeze where it will last a long time. When it is time to feed, a piece can be cut off and thawed; with a small piece the thawing time is very short. I find that it is useful to use one of those 'Teflon' coated saw-bladed knives made especially for deep-freeze use. Because of the large teeth, a quantity of meat pulp is produced which my smallest fish can eat without difficulty. However, it must be realised that unlike many other foods this is a very concentrated form of nourishment. Allowing for this it must be remembered that a comparatively small amount should be fed at one meal, although the total eaten at the end of the day can be quite considerable. Another food is cheese. This is an almost universal food and I know of no fish that will refuse it.

Those are the foods that can be fed, but when should they be fed? (See table 1.) The table is very general, because different fish require different foods and also because what I feed from day to day varies with the availability of the foods. Generally I feed heart and dried food in the morning, some live food at mid-day and as much food as I can get my hands on in the evening and then some dried food before going to bed. I feed throughout the evening in small quantities from about seven o'clock to about ten o'clock. It would be of great advantage if I could give extra meals in the morning and afternoon, but unfortunately my work prevents this. From this it can be seen that

Table 1
ADULT FISH

When I wake	Ox or Lamb's heart.
Before leaving the house	*Dried foods.
At lunch-time	*Tubifex*, White Worm, Maggots.
Arriving home in the evening	Ox or Lamb's heart, *Tubifex*, *Daphnia*, Glass Worms, Mosquito *larvae*, Earthworms, Cabbage, Lettuce, Peas, Maggots, *Gammarus* Shrimps and White Worms.
Before going to bed	*Dried foods.

*Dried foods includes all commercially prepared foods, for example, flake, freeze-dried etc.

Table 2
BABY FISH

	1st Stage	2nd Stage	3rd Stage
Very small fry (e.g. Anabantids: *Colisa chura*)	Green Water	*Infusoria* (Liquifry)	Micro-Worms Chopped White Worms Fine dried food Brine Shrimp
Medium sized fry (e.g. Barbs and larger Characins: *Barbus nigrofasciatus*)	*Infusoria* (Liquifry)	Brine Shrimp Chopped White Worm	*Daphnia* Glass Worms Mosquito *larvae* Dried Food White Worm
Large Fry (e.g. Cichlids and Livebearers: *Cichlasoma meeki*)	Brine Shrimp Micro-Worms Chopped White Worms	*Daphnia* Glass Worms Mosquito *larvae* White Worms	Earth Worms Dried Foods Ox and Lamb's heart

After the 3rd stage, the normal adult diet should be fed.

I feed approximately the same amount throughout the day; a little more in the evening. I use convenience foods when I have little time, but still give the same amount of nourishment. In this way I take full advantage of them and only use them when I have not got any time to feed the fish properly, instead of as the sole diet. It can also be seen that the fish consume large quantities of food and also that the upkeep of even a few fishes kept by this method is expensive. Why should you skimp on food at the expense of the fishes' health?

Baby Fish

Feeding baby fish is an entirely different matter; food is the most important factor when raising a large brood of good-quality fish. How many aquarists, when raising a very large brood of one of the more easily fed species such as most large cichlids or livebearers, have only twenty or thirty stunted fish left by the time they are an inch long? These losses are usually put down to cannibalism, disease or hydra, whereas it is due to (a) inappropriate foods
(b) insufficient quantity of food
(c) too small a tank.

These three points are inter-connected. If the wrong food is fed then very little of it is eaten, so many fish starve. The extra food then rots and pollutes the tank which in the first place is already too small and takes a heavy toll of fishes. One argument for supporting this is that only the fittest will survive, so bad stock is eliminated. This is true, but the good stock would be in a very poor condition. Therefore, it would have been better to have fed properly from the start and the fish of poorer quality could be removed later (providing a good food for most fishes) leaving the good stock in a very good condition.

Now taking the three above points in order:

(a) Knowing what the right foods are that you should feed is a very difficult problem to solve. It generally depends on the species and size of the fish (see table 2). On the table, the stages are just different periods in the fish's life when it can eat that sized food. There is no abrupt change from one stage to another and this must be realised. Changes from one food to another should be made gradually, phasing one food out and the other in, making sure that all the fish can eat the new food before the old is discontinued. The preparation of some of the foods in the table is quite complex so I shall deal with them as they appear in the table.

(i) Green water is very easy to make when it is not wanted, but when some is wanted, it is very difficult to get any to grow. It is important to stress that the *algae* that grows on the glass sides of aquariums are not wanted; it is the single celled *algae* that floats in the water that are small enough to be eaten by even the smallest of fishes. Whether or not most Anabantids live depends on whether the aquarist can provide *algae* for his fishes. It is not uncommon for brood after brood of Anabantids to die within their first few weeks of life because of starvation. Bright lights in the aquarium do not generally help because the higher forms of *algae* are stimulated to grow, with which the floating *algae* cannot compete. My successful formula is to take a jar of old aquarium water and leave it in a sunny window. Soon the jar will become green and according to the concentration of *algae* and the size of the brood, the required amount can be tipped into the aquarium. This is usually done by trial and error. Some *algae* is tipped into the tank and the fry's bellies are watched and if they all swell then you know that you have fed enough. When feeding *algae* it should be realised that several feedings a day are only just sufficient and also that the fry's capacity for *algae* increases daily. It is advisable to get the fish past this stage as soon as possible, because of the difficulty in maintaining a good supply of *algae*. A battery of jars in different stages of *algae* concentration is useful for keeping a good supply, but *algae* production is unreliable and changes from day to day.

(ii) *Infusoria* is a very good food for young fish, but again it is very difficult to get a reliable supply. I have bracketed *infusoria* with the famous 'Liquifry,' because although it is a food in itself it serves a more important function in stimulating production of *infusoria* in the aquarium water. When breeding fishes that will require *infusoria*, it is a good idea to add a little to the aquarium water every day. The formation of an *infusoria* culture is very unreliable but is a better way of supplying *infusoria* to the fish than relying on that which is present in the aquarium water. The attempt is quite often unsuccessful, but the aquarist should persevere and in the end he will obtain a good culture. Clearly it can be seen that several cultures should be used, making sure that at least one will become fertile. My method of getting a supply of *infusoria* is to put some dried lettuce leaves in a small tank containing about one or two quarts of old aquarium water. Decomposition of the lettuce takes place very quickly and the culture becomes cloudy. Gradually, but within a week the culture should clear; if it does not, throw the water away and start again. The culture can be examined by looking at a drop of water taken from an illuminated part of the culture under a small magnifying glass. By looking carefully, small specks of life should be seen. The propagation of these animals from one habitat to another is by air-borne spores, therefore the chances of a spore hitting the surface of the culture can be increased in many ways. The first is to use a container with a large surface area so that more air is in contact with the culture. Another way is to put the culture in a well-ventilated place so that the air-flow above the culture is increased. A culture with large amounts of rotting organic material should not be fed

because pollution will inevitably result. Thus the amount of lettuce put in the water is important. The culture should be fed in the same way as green water.

(iii) Micro-Worms can be bought from most aquarium shops in ready made cultures with instructions. These make a very good food for small fish, especially as they breed so quickly. When you buy a culture you must be prepared to put up with some smell and this usually dissuades people from buying a culture or makes them throw it away. Not much can be said about breeding them, because they breed very quickly and if you stick to the manufacturer's instructions you should have no trouble at all.

(iv) White Worms have already been discussed, but another type of white worm—the grindal worm also exists. These are smaller than white worms and are suited to smaller fish. Personally, I think that it is better to have the large white worm for all fish, chopping them up for smaller fish than to keep to separate types for large and small fish. It is also more difficult to feed grindal worms to fish because being smaller it is more difficult to separate them from the culture medium

(v) There are many forms of dried foods on sale specifically for use with baby fish. These foods take two forms: a) freeze-dried and b) powder. The powder includes the powdered flake foods and the freeze-dried includes all kinds of foods prepared by this process. These foods are all right as a standby, but should not be fed in any great quantity. The reason for this is that they will pollute the tank very quickly, because usually much too much is fed at one time to small fish and is not eaten. The difficulty is increased because, short of syphoning (which is dangerous in a baby fish aquarium) the uneaten food cannot be removed. It is very difficult to tell how much to feed, because the food is dehydrated and therefore very concentrated and a quantity of food in a powdered state looks much smaller than it really is, thus it is better to omit them altogether from the fry's diet. In every case I have mentioned, the use of dried foods in the final stage (see table 2) because, by then the fish should be large enough to eat the food without waste, although I feel that its use is still not advisable until a later stage.

(vi) The last is brine shrimp (*Artemia salina*), which I feel to be the best food for baby fishes available. They can be hatched from dried eggs in a brine solution and within forty-eight hours a reliable supply of shrimp is obtained. The main difficulties in hatching brine shrimp are: a) what concentration of salt should be used? The correct concentration is about seven level tablespoons of sea-salt per gallon. different concentrations will be found to hatch some shrimp, but the percentage of eggs that hatch will be lower. The exact amount of salt for the highest yield will depend on the type of eggs used and the hardness of the water (soft water requires more salt). Commercially prepared sea-salt for hatching shrimps or table salt can be used but the table salt, because it is very pure produces a very small yield. The eggs need the extra salts that are found in sea-salt Synthetic salts can also be used and the number of hatched eggs is significantly increased, but because of the cost it is better to use the cheaper sea-salt. b) How to collect the hatched shrimps? There are many commercial products that solve this problem. They all work on the principal that brine shrimp swim towards light. An improvised brine shrimp hatcher can be made by darkening the container and illuminating one end. After a while the brine shrimp collect in the illuminated end where they can be syphoned off. By passing this water through a fine nylon mesh the brine shrimps can be collected. The shrimps should then be placed under a cold tap to wash the salt from them. This is because the concentration of solutes in a small tank can quickly build up with the introduction of a lot of unwashed brine shrimp. When placed in the tank with the baby fish, they stay alive for a while and swim about and are easily eaten by the fish. Soon, however, they fill up with water, due to osmosis, sink to the bottom and die.

(B) How much should be fed to baby fish? Baby fish need a lot of nourishment if they are to grow to their full size. One simple rule is to feed as much as they will eat as often as possible. This is where live foods have an advantage over dried foods—when feeding in large quantities, especially to small fish, waste is inevitable and this leads to pollution. Live foods do not produce this pollution and will often stay alive for long periods in the aquarium so that a continuous supply of food is available.

(C) Size of tank? The tank should be as large as possible for several reasons:

(i) There is more natural *infusoria* in a large tank and also it has a larger supporting potential of *infusoria* (it will support a large quantity of added, culture *infusoria*).

(ii) Pollution is a very real danger in raising baby fish and a large tank keeps the concentration of toxic solutes down.

(iii) The cumulative oxygen needs of several hundred small fish is greater than one would expect.

(iv) The fish grow very quickly and soon outgrow the tank. A move would upset the fish and many fish would be lost in the process, but if a large tank was used, no change of tank would be necessary.

There is a very large range of foods that can be fed to fishes, but not always used. Most fishes are underfed; the phrase 'overfeeding' does not refer to fish eating too much, but to feeding inappropriate foods that are wasted. Feeding is a much more important task than is generally thought. The life of the more delicate species depends upon proper food and enough of it and not on the conditions under which they are kept. A good example of this is the discus (*Symphysodon* species). All discus that are in poor condition are in that condition because they were not fed properly. The aquarist then usually tries to soften the water at great expense and wonders why his fish die with the drastic environmental change. I have kept discus for two years in hard London water and I believe that the reason that they are in a very good condition is because of their diet.

THE RED-TAILED BLACK SHARK (Labeo bicolour)

AN ARISTOCRATIC FISH SAYS

D. Carney (aged 14 years)

THIS FISH is not as sinister as its name implies, which refers to its shark-like shape. But, apart from this and the fact that its mouth is underneath the head as opposed to it being in the normal place, this fish bears little resemblance to the true shark. Adult fish usually attain a length of approximately six inches and come from Thailand where they live in the paddy fields. As anybody who has kept these fish will know, they are expensive at £1 to £1·50 a time. If you decide to buy one, it is best to get a young specimen as adults can cost a lot more and won't live as long as a good, healthy young specimen. I have two superb specimens which altogether cost about £3. The first one I got a year ago. Then it was about 1½ in. and now it is about 5 in. long and still growing! The second one was bought a few months ago. Then it was in perfect health, but soon afterwards the nicely rounded belly was almost concave. The cause of this illness is still unknown to me, but eventually it pulled through and is now munching happily on *algae*-covered stones and dried food. My big shark chases three scissor-tails in short bursts of amazing speed.

On a smaller scale, appropriate to his size, my little shark chases neons and often has a quick chase after a small firemouth. In the wild the red-tailed black shark feeds almost exclusively on vegetable matter but the bigger of my sharks takes small earthworms and small bundles of white worms. The flaming red-tail is a beautiful contrast to the jet black body. The pectoral fins are a reddish brown. The colour of the tail is not, as some people would have us believe, orange-red. This colour is only found in the poorer specimens. My sharks often perch on the gravel and on stones; this is usually accompanied by the rolling of the eyes which, normally black, appear white. I have also observed this behaviour in peppered, bronze and *julii* catfish. My sharks can also swim backwards by flicking their tails. This type of swimming is used mainly for manoeuvring on to stones. The bigger of my two sharks is the biggest fish in a 48 x 15 x 15 in. community tank. Every time new fish are put in, he threatens them by flicking his tail and jerking. He only does this to assert himself and would never dream of hurting any other fish except for sucking loaches for which he has a special hatred. I would never consider being without the red-tailed black shark as he is the most beautiful, peaceful, aristocratic and intelligent freshwater fish I have ever seen.

News from AQUARISTS' SOCIETIES

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

THE **Llantwit Major A.S.** at their November meeting held an inter-club contest with Swansea A.S. Results: Llantwit Major 25 points, Swansea 17 points. Winners—Class M: 1 and Best Fish in Show, J. Thompson (L.M.A.S.); 2 and 4, H. Chick (L.M.A.S.); 3, J. J. Edwards (L.M.A.S.). Class T: 1, 3 and 4, G. Best (Swansea); 2, G. Lewis (L.M.A.S.). While the judging was in progress members were entertained to the showing of Keith Barraclough's interesting film of his recent Far Eastern journey in search for tropical fish.

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ENTRIES for the **Hartlepool A.S.** open show exceeded 700. Results—Breeders Pairs (Egg-layers): 1, Mr. and Mrs. Holmes (Castleford); 2, McArdle & Kirk (Castleford); 3, B. Jackson (Redcar). Breeders (Pairs Livebearers): 1, F. Myers (Independent); 2, Mr. and Mrs. Holmes (Castleford); 3, J. A. Whiteley (Airborough). Breeders Class 6 Fish (Egglayers): 1, K. Alder (Hartlepool); 2, Mr. Lynch (Stanley); 3, J. Furness (Castleford). Breeders Class 6 Fish (Livebearers): 1, Mr. and Mrs. J. Dorner (Redcar); 2, Mr. and Mrs. Daly (N.G.L.S.); 3, S. Bottomley (Hartlepool). Angels: 1, S. Hay (Hartlepool); 2, N. Blenkin (Bridlington); 3, R. Wrightson (Birmingham). A.V. Fighter: 1 and 3, F. Myers (Independent); 2, Dudley (Hartlepool). E.L.T.C.: 1, J. Middlemast (Stanley); 2 and 3, F. Askew (South Shields). A.V. Labyrinth: 1, R. Atherton (Hartlepool); 2, M. Sneddon (Hartlepool); 3, P. Wright (South Shields). Tropical Catfish: 1, Mr. and Mrs. Saunders (Stockton); 2, M. B. and H. Knock (Featherston); 3, C. Robinson (Stanley). Corydoras: 1, McArdle & Kirk (Castleford); 2, D. Turnbull (Mount Pleasant); 3, Mr. and Mrs. Lamb (Redcar). A.V. Guppy: 1 and 2, N. Blenkin (Bridlington); 3, Mr. Blance (Hartlepool). A.V. Platy: 1, Mr. McClenachan (B.K.A.); 2, Mr. Dawson (Hartlepool); 3, Mr. and Mrs. Liddle (Ashington). A.V. Molly: 1, Mr. and Mrs. Holmes (Castleford); 2, W. Mooney (Stockton); 3, K. Alder (Hartlepool). A.V. Swordtail: 1, J. Chamberlain (Hartlepool); 2, J. Emerson (Castleford); 3, Mr. and Mrs. Lamb (Redcar). Cichlids Small: 1, D. Turnbull (Mount Pleasant); 2, D. Nessworthy (Northumbrain); 3, Mr. and Mrs. Holmes (Castleford). Cichlids Large: 1, M. Moreland (Stockton); 2, S. Middlemast (Stanley); 3, M. Sneddon (Hartlepool). Rift Valley Cichlids: 1 and 3, R. Atherton (Hartlepool); 2, P. Newton (Hartlepool). Rasbora: 1 and 2, J. A. Whiteley (Airborough); 3, R. Atherton (Hartlepool). Characin Small 1, F. Myers (Independent); 2, G. Connely (Stanley); 3, Mr. and Mrs. Richardson (Scarborough). Characin Large: 1, R. Atherton (Hartlepool); 2, E. Williams (Hartlepool); 3, Mr. and Mrs. J. Dorner (Redcar). Barbs Small: 1, J. A. Whiteley (Airborough); 2, Mr. and Mrs. Holmes (Castleford); 3, R. Atherton (Hartlepool). Barbs Large: 1, V. Davidson (Northumbrian); 2, B. Cooper (Hartlepool); 3, Mr. and Mrs. Hunt (Ashington). Sharks: 1, K. Greenley (Half Moon); 2, D. Nessworthy (Northumbrian); 3, H. Garthwaite (Hartlepool). A.O.V.: 1, McArdle & Kirk (Castleford); 2, D. Nessworthy (Northumbrian); 3, L. Collins (Stockton). Marine: 1 and 2, A. Harrison (Billingham); 3, J. Ryan (Billingham). A.V. Coldwater: 1, Mr. and Mrs. Richardson (Scarborough); 2, Mr. Quantrill (Priory); 3, A. Frisby (Hull). A.V. Loach: 1, M. Sneddon (Hartlepool); 2, D. Jackson (Independent); 3, K. Alder (Hartlepool). A.V. Female: 1, G. Gillespie (Castleford); 2, Mr. Morgan (Castleford); 3, L. Collins (Stockton). Junior Class: 1, Master M. McMartney (Half Moon); 2, Master C. Hay (Hartlepool); 3, Master A. Clarke (Castleford). Best Fish in Show: Large Barb—V. Davidson (Northumbrian). Best Exhibitor: R. Atherton (Hartlepool). Best Society: Castleford.

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THE Annual Furnished Aquaria Show of the **Loughborough and District A.S.** was held in November and the proceeds were in aid of John Storer House Foundation. The following members were successful in gaining awards: Furnished Aquaria Shield: 1, M. Chafer; 2, S. Purdy; 3, G. Howe; 4, Ian Yeomans.

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TOTAL number of entries for **Northampton and District A.S.** annual open show was 448. Best fish in show was won by A. Crew (W.A.D.A.S.).

Results were as follow—Barbs: 1, V. Hill (Independent); 2, D. Sharpe (N.A.D.A.S.); 3, T. Smith (N.A.D.A.S.). Barbs: 1, M. Crew (W.A.D.A.S.); 2, J. Salisbury (Bedworth); 3, A. J. Waldman (Sudbury); 4, J. Davies (N.A.D.A.S.). Characins: 1, P. A. Moye (Sudbury); 2, G. Lester (Sudbury); 3, L. J. Brazier (Sudbury); 4, J. M. Bailey (Sudbury). Characins: 1 and 2, L. J. Brazier (Sudbury); 3, J. M. Bailey (Sudbury); 4, M. J. Lewis (Sudbury); Characins: 1, Mr. and Mrs. Ward (Banbury); 2, P. A. Moye (Sudbury); 3, J. and M. Smith (Independent); 4, A. J. Tupman (W.A.D.A.S.). Cichlids: 1 and 4, A. Crew (W.A.D.A.S.); 2, A. J. Tupman (W.A.D.A.S.); 3, A. J. Waldman (Sudbury). Cichlids: 1, A. Robinson (N.A.D.A.S.); 2, T. Chambers (W.A.D.A.S.); 3, A. Crew (W.A.D.A.S.); 4, Mr. and Mrs. Ward (Banbury). Cichlids: 1, Mr. and Mrs. Ward (Banbury); 2, A. J. Firkins (N.A.D.A.S.); 3, M. J. Lewis (Sudbury)); 4, L. J. Brazier (Sudbury). Anabantids: 1, A. Hagland (W.A.D.A.S.); 2, J. M. Bailey (Sudbury); 3, M. J. Lewis (Sudbury); 4, A. P. Taylor (Sudbury). Killies: 1, Mr. and Mrs. Short (Nuneaton); 2, L. J. Brazier (Sudbury); 3, T. A. Cruickshank (Ealing). A.O.V. Catfish: 1, M. J. Lewis (Sudbury); 2, T. J. Pilsbury (N.A.D.A.S.); 3, T. A. Cruickshank (Ealing) 4, R. A. Pilsbury (N.A.D.A.S.). Corydoras and Brochis: 1 and 3, L. J. Brazier (Sudbury); 2 and 4, P. A. Moye (Sudbury). Rasboras: 1, J. M. Bailey (Sudbury); 2, M. J. Lewis (Sudbury); 3, P. Chambers (W.A.D.A.S.); 4, L. W. Poole (Banbury). Danios and W.C.M.M.: 1 and 2, P. A. Moye (Sudbury); 3, R. Elliott (Corby); 4, P. Flint (W.A.D.A.S.). Loach: 1, N. Short (Nuneaton); 2, T. J. Pilsbury (N.A.D.A.S.); 3, A. Drage (N.A.D.A.S.); 4, R. Dewis (Independent). A.O.V. Tropical: 1, L. J. Brazier (Sudbury); 2, Mr. and Mrs. Hayes (Hinckley); 3, D. Geary (N.A.D.A.S.); 4, J. M. Bailey (Sudbury). Labeos: 1 and 3, R. Elliott (Corby); 2, M. Crew (W.A.D.A.S.); 4, K. Lyon (N.A.D.A.S.). Pairs (Egglayers): 1, J. M. Bailey (Sudbury); 2, M. J. Lewis (Sudbury); 3, G. Lester (Sudbury); 4, M. Crew (W.A.D.A.S.). Pairs (Livebearers): 1, D. J. Carnegie (Independent); 2, Mr. and Mrs. Ward (Banbury); 3, R. Dewis (Independent); 4, R. Marshall (N.A.D.A.S.). Male Guppy: 1, R. Wilson (Corby); 2, D. J. Carnegie (Independent); 3, I. Short (Nuneaton); 4, A. P. Taylor (Sudbury). Swordtail: 1, A. Crew (W.A.D.A.S.); 2, A. J. Tupman (W.A.D.A.S.); 3, J. M. Bailey (Sudbury); 4, A. Hagland (W.A.D.A.S.). Platy: 1, J. and M. Smith (Independent); 2, M. Crew (W.A.D.A.S.); 3, M. J. Lewis (Sudbury); 4, P. Chambers (W.A.D.A.S.). A.O.S. Livebearer: 1, L. W. Poole (Banbury); 2, D. Cruickshank (Ealing); 3, J. Davies (N.A.D.A.S.); 4, D. J. Carnegie (Independent). S.T. Goldfish: 1, 2 and 3, J. A. and J. R. Amos (N.A.D.A.S.); 4, M. Crew (W.A.D.A.S.). T.T. Goldfish: 1, 2 and 4, J. Salisbury (Bedworth); 3, J. A. and J. R. Amos (N.A.D.A.S.). A.O.S. Coldwater: 1, J. A. and J. R. Amos (N.A.D.A.S.). 2, J. Salisbury (Bedworth); 3, C. Pratt (Bedworth); 4, A. Robinson (N.A.D.A.S.). Broods Egglayer: 1, P. A. Moye (Sudbury); 2 and 4, Mr. and Mrs. Hayes (Hinckley); 3, Mr. Marsden (Corby. Broods Livebearer: 1, A. K. Thomas (W.A.D.A.S.); 2, R. Wilson (Corby); 3 and 4, A. Drage (N.A.D.A.S.). Plants: 1 and 2, A. K. Thomas (W.A.D.A.S.). Novelty Furnished Jar: 1, A. K. Thomas (W.A.D.A.S.); 2, R. Hill (N.A.D.A.S.); 3 and 4, R. A. Pilsbury (N.A.D.A.S.).

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AT the November meeting of the **Suffolk Aquarist and Pondkeepers Association** members heard how a fish tank was set up by the Treasurer Mr. M. Thurlow and donated to Angel Court (a senior citizens hostel) by the club.

The main event of the evening was a Mystery Lecture by Mr. Pye. This took the form of a slide show with questions being asked about each picture. The slides covered three branches of the hobby, viz: tropical fish, marine fish and plants. Those present enjoyed the lecture and found it very informative.

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ENTRIES for the coldwater section at the **Bristol A.S.** Open Show this year were up, but the tropical entries were a great disappointment. The results were as follow:

Goldfish (5 inch limit): 1 and 2, W. Ham; 3, S. Lloyd; 4, T. Hamshire. Bristol Shubunkins (3 inch limit): 1 and 4, H. J. Whiting; 2 and 3, G. Bell. Bristol Shubunkins (over 3 inches, not over 5 inches): 1, R. J. Pinnock; 2, D. S. Langdon; 3, A. J. Churchill; 4, H. J. Whiting. Veiltails: 1 and 3, S. Tibble; 2, A. E. Roberts; 4, F. Orme. Moors: 1, A. E. Roberts; 2 and 4, S. Tibble; 3, S. Lloyd. Telescopes, etc.: 1 and 2, W. Leach; 3, R. J. King; 4, G. Bell. Orandas: 1, 3 and 4, A. E. Roberts; 2, R. J. King. Nymphs and Comets: 1, C. Packer. Fantails Scaled: 1, S. Lloyd; 2 and 3, C. R. Packer; 4, R. J. King. Fantails Calico: 1, R. J. Pinnock; 2, R. J. King; 3, S. Tibble; 4, C. R. Packer. Koi, A.O.V. Pond or River (9 inch limit): 1, C. R. Packer; 2, J. Phillips; 3 and 4, C. Summers. Bristol Shubunkins (bred 1974): 1, 3 and 4, L. G. Emery; 2, R. J. King. Moors (bred 1974): 1, 2, 3 and 4, A. E. Roberts. A.O.V. Fancy Fish (bred 1974): 1, F. Orme; 2 and 3, R. J. King; 4, L. G. Emery. Breeders Team 4 Fish Singletail (bred 1974): 1, 2 and 3, L. G. Emery; 4, J. Ball. Breeders Team 4 Fish Twintail (bred 1974): 1 and 2, A. E. Roberts; 3 and 4, R. J. King. Bristol Shubunkins Matched Pairs (5 inch limit): 1, L. G. Emery; 2, A. J. Churchill; 3, H. J. Whiting; 4, W. H. Clark. Novice Bristol Shubunkins (5 inch limit): 1, 2 and 3, J. Ball; 4, R. J. Bennett. Furnished Aquaria: 1, C. J. Cotterill. Furnished Aquaria Inter Club G.S.G.B. Aquatic Plant: 1, A. H. Morgan; 2, C. J. Cotterill; 3 and 4, W. Leach. Fighting Fish: H. C. Graham. Labyrinths: 1, R. A. Bennett; 2,

A. H. Morgan; 3, T. Hamshire. Barlors Species: 1, R. A. Bennett. A.O.V. Characin: 1 and 3, R. A. Bennett; 2 and 4, J. Phillips. Cichlids (small): 1, H. C. Graham; 2 and 3, C. J. Cotterill. Cichlids (Large): 1, 2 and 3, E. N. Bowden. Angels: 1 and 3, H. C. Graham; 2, T. Hamshire. Catfish Corydoras: 1 and 2, A. H. Morgan. Catfish A.O.V.: 1 and 2, A. H. Morgan. A.O.V. Egglayers: 1, T. Hamshire; 2, R. A. Bennett; 3 and 4, A. H. Morgan. Guppies: 1, 2, 3 and 4, H. H. Bell. Swordtails: 1 and 2, H. H. Bell. A.O.V. Livebearers: 1, A. H. Morgan. Tropical Breeders (Livebearers): 1, J. Phillips. Marine Exhibits: 1, C. Summers.

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A RECORD entry rewarded the efforts of the **Hinckley A.S.** for their third Open Show. The Best in Show was won by R. Clarke of Pelsall. Results—A.V. Guppy: 1 and 4, M. Braimbridge; 2, G. Roberts; 3, Master I. Short. A.V. Molly: 1, G. & N.; 2, Mr. Gray; 3, T. Booth; 4, I. Lucas. A.O.V. Livebearer: 1, Mr. Poole; 2, J. Mayle; 3, G. & N; 4, J. L. Smith. Characin (small): 1, R. Phillips; 2, Mr. Jackson; 3, N. Fox; 4, Mr. and Mrs. M. Short. A.O.V. Characin: 1, F. R. Shakespeare; 2, D. Wilson; 3, G. Bastin; 4, K. Done. Barbs (small): 1, R. Phillips; 2, A. Dale; 3, J. Mayle; 4, K. Done. Barbs (A.O.V.): 1, T. Nicholson; 2, D. A. Smith; 3, Mr. and Mrs. Bull; 4, R. Phillips. Cichlids (small): 1, R. North; 2, Mr. and Mrs. Ward; 3, K. Done; 4, Mrs. L. Cox. Angel Fish: 1, Mr. and Mrs. Ward; 2, G.V.S.R.; 3, T. Davis; 4, M. Nightingale. Cichlid (A.O.V.): 1, R. Clarke; 2, G.V.S.R.; 3, A. Simmonds; 4, T. Nicholson. Siamese Fighter: 1, J. Mayle; 2, T. Redfern; 3, G. & N.; 4, J. Goodman. Anabantid (A.O.V.): 1, G. & N.; 2, A.W.W.; 3, G. Bastin; 4, J. Salisbury. Corydoras and Brochis: 1, G.V.S.R.; 2, G. Bastin; 3 and 4, J. Goodman. A.O.V. Catfish: 1, G. & N.; 2, M. Nightingale; 3, J. Goodall; 4, J. Mayle. A.V. Loach: 1, R. North; 2, H. Brakes; 3, M. Braimbridge; 4, D. & H. A.V. Killiefish: 1 and 2, Mr. Jackson; 3, F. Hirst; 4, R. Hughes. A.V. Rasbora: 1, Mr. and Mrs. Bull; 2 and 3, Mr. and Mrs. G. Hayes; 4, D. & H. Danio & W.C.M.M.: 1, 3 and 4, B. Dewis; 2, Mr. Jackson. Egglayer (Pairs): 1, H. Brakes; 2, G.V.S.R.; 3, R. Dewis; 4, R. Phillips. Livebearer (Pairs): 1, T. Redfern; 2, R. Clarke; 3, A. Dale; 4, F. Hirst. Egglayer (Broods): 1, 2 and 4, Mr. and Mrs. G. Hayes; 3, F. Hirst. Livebearer (Broods): 1, T. Redfern; 2, B. Jeffs; 3, C. Pratt; 4, M. Braimbridge. A.O.V. Tropical: 1, T. Booth; 2, 3 and 4, Mr. and Mrs. G. Hayes. Junior Class: 1, A. Bull; 2 and 3, C. Pratt; 4, C. Stringer. Single Tail Goldfish: 1, H. Brakes; 2, A.W.W.; 3, Mr. and Mrs. Barlow; 4, C. Pratt. Twintail Goldfish: 1, A.W.W.; 2, Mr. Jackson; 3, G. & N.; 4, J. Salisbury. A.V. Pond or River: 1, C. Pratt; 2, S. Andrews; 3 and 4, H. Brakes. Ladies Class: 1, Mrs. N. Nesbit; 2, Mrs. G. Hayes; 3, Mrs. Bull; 4, Mrs. Gray.

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ON retiring as chairman of the **Newbury and District A.S.** Mr. Swait was sincerely thanked at the annual general meeting and made President in appreciation of all the hard work and service he has given to the Society.

The Society's Perpetual Table Show Trophy was presented to R. Canning. Later in the month 35 members enjoyed a coach outing to the Aquarium Show '74.

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THE result of the election for the Committee of the **Barry A.S.** held at the annual general meeting recently was—President: D. Warmeant; Vice-President: Mrs. Currie; Chairman: A. Wallace; Vice-Chairman: C. Webber; Treasurer: Mrs. E. Steer; Secretary: A. Smith, 8 Salisbury Road, Barry; Show Secretary: G. Parker; Assistant Show Secretary: M. Guthrie; Technical Advisor: S. Nelson.

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RESULTS of the second **Newbury and District A.S.** Open Show were as follow—Ag: 1, Mrs. P. Jupe (Gosport); 2, Mrs. G. Barrett (Newbury); 3, M. Mewett (Salisbury); 4, S. Rigby (Gosport). Ba: 1, R. Adams (Salisbury); 2, K. Smith (Runnymede); 3, K. Hillier (Newbury); 4, A. Marshall (Basingstoke). Br: 1, B. Bisson (Basingstoke); 2 and 4, P. Grosvenor (Runnymede); 3, R. Onslow (Basingstoke). Ca: 1, C. Turner (Cardiff); 2, H. Nicholls (Runnymede); 3, T. Fraser (Basingstoke); 4, G. Fogarty (Gosport). Cb: 1, K. Hillier (Newbury); 2, B. Bisson (Basingstoke); 3, K. Smith (Runnymede); 4, D. Sheriden (Newbury). Ca: 1, Mrs. V. Lloyds (Independent); 2 and 3, C. Turner (Cardiff); 4, R. Onslow (Basingstoke). Da: 1, T. Winter (Southampton); 2, Mrs. J. Hulford (Newbury); 3, D. Purchard (Tunbridge); 4, R. Aslett (Devizes). Db: 1, B. Bisson (Basingstoke); 2 and 3, A. Weaire (Southampton); 4, R. Ralph (Newbury). Dc: 1, L. Little (Bracknell); 2 and 3, K. Ress (Gosport); 4, K. Hale Gosport). D: 1, P. Brown (Southampton); 2, R. Saunders (Gosport); 3, R. Adams (Salisbury); 4, D. Elliot (Newbury). Ea: 1, K. Ress (Gosport); 2, T. Cripps (Newbury); 3, B. Bisson (Basingstoke); 4, D. McGinley (Independent). E: 1, Mrs. V. Lloyds (Independent); 2, R. Cannings (Newbury); 3, D. Wearement (Cardiff); 4, T. Cripps (Basingstoke). F: 1, P. Grosvenor (Runnymede); 2, D. Russo (Southampton); 3, P. Roberts (Bracknell); 4, Mrs. V. Lloyds (Independent). G: 1 and 2, B. Jones (Basingstoke); 3, P. Saunders (Gosport); 4, B. Barrett (Newbury). H: 1, W. Knight (Gosport); 2, T. Fraser (Basingstoke); 3, T. Whitehead (Newbury); 4, T. Cripps (Basingstoke). J: 1, P. Rushbrooke (Reading); 2, K. Ress (Gosport); 3, T. Fraser (Basingstoke); 4, R. Canning (Newbury). K: 1, B. Bisson (Basingstoke); 2, J. Fraser (Basingstoke); 3, R. Onslow (Basingstoke); 4, A. Chaplin (Basingstoke). L: 1, A. Tull (Salisbury); 2, R. Adams (Salisbury); 3, K. Hillier (Newbury); 4, C. Turner (Cardiff). Ma: 1, K. Hale (Gosport); 2, D. Purchard (Tunbridge); 3, D. Wearement (Cardiff); 4, R. Canning (Newbury). Mz: 1, R. Onslow (Basingstoke); 2, T. Cripps (Basingstoke); 3, P. Grosvenor (Runnymede); 4, Mrs. V. Lloyds (Independent). O: 1, S. Rigby (Gosport); 2, K. Hale (Gosport); 3, A. Smith (Petersfield); 4, D. McGinley (Independent). P: 1 and 3, E and T. Tester (Mid Sussex); 2 and 4, C. Isungburt (Runnymede). Q: 1 and 3, R. Canning (Newbury); 2, B. Bisson (Basingstoke); 4, W. West (Salisbury). R, F.B.A.S. Championship: 1, B. Bisson (Basingstoke); 2, A. Davidson (Basingstoke); 3, Mrs. Newbury (Gosport); 4, F. Cripps (Newbury). S: 1, L. Little (Bracknell); 2, A. Daniels (Independent); 3 and 4, W. Crockford (Petersfield). T: 1 and 3, B. Bisson (Basingstoke); 2, L. Little (Bracknell); 4, T. Fraser (Basingstoke). Uab: 1, W. Crockford (Petersfield); 2, R. Canning (Newbury); 3, J. Jupe (Gosport); 4, R. Adams (Salisbury). Ubc: 1, Green & Rudland (Reading); 2 and 4, W. Crockford (Petersfield); 3, R. Onslow (Basingstoke). V: 1, 2 and 4, Green & Rudland (Reading); 3, A. Marshall (Basingstoke). W: 1, J. Jupe (Gosport); 2, R. Scalplehorn (Newbury); 3, R. Scurvin (Bishop Cleeve); 4, R. Adams (Salisbury). Z: 1, B. Barrett (Newbury); 2, 3 and 4, L. Little (Bracknell). Xbm: 1, D. Sheriden (Newbury); 2, Mrs. Newbury (Gosport); 3, M. Chapman (Brighton Hill); joint 4, C. Turner (Cardiff) and R. Turner (Didcot). Xot: 1, C. Turner (Cardiff); 2, B. Jones (Basingstoke); 3, Mrs. Newbury (Gosport); 4, W. West (Salisbury).

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AT their October meeting members of the **Dorchester and District A.S.** saw an absorbing film produced by the F.B.A.S. on plants grown in the tropical aquarium. The fish for the table show this month were rasboras, female guppies and male guppies. Results—Rasboras (Section 1): 1, R. Christopher. Rasboras (Section 2): 1, G. H. Fox; 2, R. Cook; 3, H. Dorrick. Female Guppies (Section 1): 1, 2 and 3, R. Christopher. Female Guppies (Section 2): 1, Mrs. M. Fox; 2, P. Connors; 3, Mrs. M. Cox. Male Guppies (Section 1): 1, Allan Billington; 2 and 3, R. Christopher. Male Guppies (Section 2): 1, R. Cook.

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THE October meeting of the **Bristol A.S.** discussed the prospects of there being any future shows staged by the society, as the voluntary and active support being given to the erection of a two day show seems to fall on the shoulders of five or six people. Those present at the meeting were asked for suggestions as to the form that future shows might possibly take. Several suggestions were put forward, all of which will be discussed by the committee.

A table show was the main feature at the November meeting, the results being as follow—A.O.V. Pond and River: 1 and 2, J. Phillips; 3, W. Ham. A.O.V. Fancy Fish: 1, C. Summers. Coldwater Plants: 1 and 2, Miss A. H. Morgan. Tropical Classes Labyrinths: 1, Miss A. H. Morgan. Livebearers: Miss A. H. Morgan. A.O.V. Egglayers: Miss A. H. Morgan. Tropical Plants: 1, 2 and 3, Miss A. H. Morgan. While the judging was taking place Mr. J. Phillips with a little help from the floor entertained with a discussion of the pond and river fish that were on show.

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RESULTS of the **Ilfracombe and District A.S.** Open Show were as follow—Best Fish in Show: A. Bligh. Highest Points: A. D. S. Kirby. Best Fish by Junior: Miss N. Paul. Best Livebearer: R. Wolfe. Best Coldwater Marine: 1, Mr. Vickery; 2 and 3, L. A. Wilkins. Furnished Aquaria: Ilfracombe Junior School. Breeders (Egglayers): 1, A. D. S. Kirby; 2 and 3, M. Poole. Breeders (Livebearers): 1, M. Leader. A.O.V. Coldwater: 1, J. Webber; 2, J. Mayne. Twintailed Goldfish: 1 and 3, Mrs. J. Griffiths; 2, J. Webber. Singletailed Goldfish: 1 and 3, Mrs. J. Griffiths; 2, J. Webber. Best Mollie: 1, J. Vickery; 2, A. Bligh; 3, Miss N. Paul. Best Platy: 1, R. Wolfe; 2, M. Lee; 3, R. Luscombe. Swordtail (Any Variety): 1, W. F. M. J. Coles; 2, Master A. Smith; 3, J. Mayne. Guppy (Female): 1, M. Leader; 2 and 3, J. Rundle. Guppy (Male): 1, W. G. Reid; 2, A. D. S. Kirby; 3, W. F. M. J. Coles. Sexed Pairs: 1 and 2, A. D. S. Kirby; 3, Mrs. B. Mallabone. A.O.V. Tropical Fish: 1, T. Gordon; 2, M. Leader; 3, B. Wolfe. Botia and Loach: 1, A. D. S. Kirby; 2, D. Perryman; 3, A. Bligh. Danio and Minnows: 1 and 3, Miss N. Paul; 2, R. Wolfe. Rasboras: 1 and 2, J. A. Wood; 3, M. Poole. Corydoras and Brochis: 1 and 2, M. Lee; 3, A. D. S. Kirby. A.O.V. Catfish: 1, Mrs. E. Hart; 2, A. Bligh; 3, M. Poole. Killies: 1, 2 and 3, Mrs. Lay. A.O.V. Labyrinths: 1, A. Bligh; 2, Mrs. A. Corner; 3, S. Darke. Siamese Fighters: 1, J. A. Wood; 2, W. F. M. J. Coles; 3, M. Leader. A.O.V. Cichlids: 1, B. Ley; 2, Mrs. K. Paul; 3, J. Vickery. Nannacara, Pelmatochromis and Apistogramma: 1, A. Bligh; 2, M. Poole 3, W. Horswill. Angels: 1, J. Corner; 2, M. Leader; 3, Mrs. K. Paul. A.O.V. Characins: 1, R. McDonald; 2 and 3, M. Poole. H. & H. and Cherrodon: 1, M. Poole; 2, R. Wolfe; 3, Mrs. G. Ley. Barbs: 1 and 2, Mrs. E. Hart; 3, Mrs. J. Griffiths. Total number of entries—337.

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DURING November the **Bournemouth A.S.** entertained visitors from Weymouth, who arrived for the inter club show.

For this month the Society held a Film-Slide Show, the subject being Corydoras. The film show was very well done and the members found it particularly enjoyable.

At the end of the meeting Weymouth won by 13 points to 11 points. Table Show results—Pairs: 1 and 2, R. Coombes (Bournemouth); 3, Weymouth. Danio W.C.M.M.: 1, Weymouth; 2 and 3, K. Gibbs (Bournemouth.) Common Goldfish: 1 and 2, B. Coombes (Bournemouth); 3, Weymouth. Pairs: 1, Mrs. Bebb (Bournemouth); 2 and 3, Weymouth. Twintails: 1, 2, and 3, Weymouth.

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THE **North Gwent A.S.** wish to thank Mr. M. Addicott for an excellent slide show given to them on 23rd October, and also thank

Mr. D. Warmeant for an excellent evening's entertainment consisting of a slide show given on 13th November.

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AT the October meeting of the **Accrington and District A.S.**, a group quiz on various aspects of fishkeeping and general knowledge of the subject gave members a very lively and interesting evening.

Results of the table show were as follow—Best in Show: M. Wild. Coldwater: 1, M. Wild; 2, F. Foote; 3, N. Holden. Pairs (Egglayers): 1 and 2, J. Grimes; 3, I. Haworth. Breeders (Egglayers): 1, M. Wild; 2, J. Grimes. A.O.V. Tropical 1 and 3, G. Brown; 2, B. Haworth. Juniors: 1 and 2, B. Haworth.

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THE **Amersham and District A.S.** held their annual members open show in November. Approximately thirty members attended with a total of 116 fish. Class winners were as follows—Barbs: 1, P. Spedding (Jnr.); 2, D. Barker; 3, B. Jessop. Characins: 1, S. Thompson; 2 and 3, D. Barker. Cichlids: 1 and 3, A. Rollason; 2 and 4, R. Harper. Labyrinths: 1 and 2, R. Steptoe; 3, Mrs. M. Daniels. Egglaying Tooth Carps: 1, 3 and 4: B. Jessop; 2, D. Barker. Catfish: 1 and 2, A. Rollason; 3, R. Steptoe; 4, K. North. Rasboras: 1 and 3, B. Jessop; 2, R. Steptoe; 4, D. Barker. Loaches: 1 and 2, P. Guse (Jnr.). A.V. Egglayer: 1, N. Bishop (Jnr.); 2, A. Rollason. A.V. Livebearer: 1 and 3, B. Jessop; 2, R. Steptoe; 4, R. Harper. A.V. Coldwater: 1, P. Daniels (Jnr.). Breeders Class: 1, R. Harper; 2, A. Rollason; 3, K. North. Furnished Show Jar Competition: 1, S. Thompson; 2, Mrs. W. Thompson; 3, K. North. Best Fish in Show (a Cichlid): A. Rollason. Highest Pointed Junior Fish: N. Bishop and P. Daniels (tied on points). Special Prize (member with most entries): D. Barker 27) fish.

Meetings and table shows, film shows and speakers are held first and third Wednesday in every months at the Amersham Community Centre at 8 p.m. Anyone interested in joining the club please contact R. Steptoe, 26 Woodside Road, Micklefield, High Wycombe, Bucks.

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THE **Reading and District A.S.** have recently held the annual general meeting and the positions have been filled as follows—Chairman: A. S. Gibson, 27 Hollydale Close, Reading, Berks. Secretary: S. R. Broome, 40 Caldbeck Drive, Woodley, Berks (Reading 694280).

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THERE were 82 entries when the Manchester section of the **Fancy Guppy Association** held their open show and A. Charlton won Best in Show with a topsword snakeskin male. The Manchester section meet at the Longsight Hotel on the first Sunday every month. Visitors welcomed.

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RESULTS of the third annual open show of the **Irish T.F.S.** were—Class Aa: 1, G. Smith; 2, D. F. Hughes; 3, S. Mooney; 4, J. Dunne. Class Ab: 1, T. Ring; 2, S. Mooney. Class B: 1 and 3, R. S. Revie; 2, B. Walsh; 4, G. Smith. Class Ca: 1, G. Smith; 2, J. Russell; 3, S. MacNaughton; 4, C. Dacus. Class Cx: 1 and 3 (joint), M. Berry; 2, S. Cooke; 3 (joint), T. S. Gibson. Class Da: 1, J. McGready; 2, C. Dacus; 3, J. Littlewood; 4, W. I. Pollock. Class Db: 1, J. Dunne; 2, W. I. Pollock; 3, G. Smith; 4, M. Cassidy. Class Dx: 1, T. S. Gibson; 2, C. Dacus; 3, R. Reay; 4, J. McCready. Class E: 1, P. Reilly; 2 and 4, J. McFarlane; 3, J. Cashman. Class F: 1, W. I. Pollock; 2, G. Smith; 3, J. Littlewood; 4, M. Berry. Class GL: 1, C. Dacus; 2 and 4, D. M. Frater; 3, T. S. Gibson. Class H: 1, D. M. Frater; 2, D. Hughes; 3 and 4, J. McFarlane. Class JK: 1 and 3, W. I. Pollock; 2, G. Smith; 4, Pat Naismith. Class N: 1, 2 and 3: C. Dacus; 4, J. McGready. Class OP: 1, 2, 3 and 4: K. Norton. Class Q: 1 and 2, R. S. Revie; 3, D. Hughes; 4, Anne Keenan. Class R: 1, Pat Naismith; 2 and 4, D. Tabuteau; 3, K. Norton. Class S: 1, 2 and 3, G. Smith; 4, R. Reay. Class TM: 1, P. McMahon; 2, D. M. Frater; 3, J. McFarlane; 4, C. Dacus. Class U: 1, 2 and 4: S. MacNaughton; 3, M. Cassidy. Class V: 1, Mrs. Jean Smith; 2, D. Tabuteau; 3, Pat Byrne. Class W: 1, 2 and 3, D. Tate; 4, Pat Naismith. Class X: 1 and 4, Pat Naismith; 2 and 3, C. Dacus. Class Y: 1 and 2, T. King; 3, Keiron King. Class YA (Marine Invertabrates): 1, 2 and 3, M. Cassidy; 4, Dermot King. Class Z: 1, M. Berry; 2, 3 and 4: C. Dacus. Best Fish in Show: Pat Naismith. Most Points: C. Dacus. Club Competition: 1, Irish Tropical Fish Society (106 points); 2, Bangor Aquatic Breeders Society (45 points); 3, Dublin Society of Aquarist (29 points). Club Stands: 1, Dublin Society of Aquarists.

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MEMBERS of the **Weymouth A.S.** recently heard Mr. Bennett of Bennetts Water Lily and Fish Farm give a very interesting talk on how he became interested in water-lilies and goldfish and later transformed some old brick clay pits into huge water-lily lakes. This talk was illustrated by colour slides which not only showed the progress made over the past fifteen years on the fish farm, but also depicted the various colours and types of water-lily that are obtainable. Mr. Bennett was also a founder member of the Club which was formed in January, 1952.

The table show results were as follow—Barbs: 1, 2, 3 and 4: T. Hatton. Angels: 1 and 4, T. Hatton; 2 and 3, Mrs. P. Carter. Dwarf Cichlids: 1, D. Mullen; 2, J. Brooks; 3, J. Fancy; 4, A. Billington. Cichlids: 1, D. Mullen; 2, B. Dalley; 3 and 4, C. Taylor.

Meetings are held on the second Tuesday of each month at the Ratcliff Hall, Queens Road, Radipole Spa, Weymouth, Dorset.

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THE recent table show of the **South Park Aquatic (Study) Society** for the Novices Trophy open to members only attracted twenty-six entries. While the judging was in progress with Mrs. M. Dudley and Mr. P. Biernacki, a talk on "Winter Pond Care" was given by Mr. T. Leach with questions and answers.

Results—Singletail: 1 and 3, G. Herring; 2, D. Seymour. Twintail: 1, D. Seymour; 2 and 3, G. Strutt. Native and Foreign: 1 and 2, R. Trim; 3, G. Herring. D. Seymour won the Novice Trophy with a Bubble Eye Goldfish.

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RESULTS of the **Tyne Tees Area Association** of the F.B.A.S. Interclub Show were Class Ba: 1 and 2, Mr. and Mrs. Hunt (A.A.S.); 3, Mr. Graham (N.T.F.S.). Class Bz: 1 and 2, Mr. Wrightson (H.D.A.S.); 3, Mr. Richardson (H.D.A.S.). Class Cab: 1, Mr. Richardson (H.D.A.S.); 2, Mr. Marshall (H.D.A.S.); 3, Mr. Hull (T.A.S.). Class Cz: 1, Mr. and Mrs. Liddle (A.A.S.); 2, Mr. Apperley (H.D.A.S.); 3, Mr. Wright (S.S.A.S.). Class Dac: 1, Mr. Askew (S.S.A.S.); 2, Mr. Hickman (K.A.A.); 3, Mr. Graham (N.T.F.S.). Class Db: 1 and 2, Mr. Enright (S.S.A.S.); 3, Mr. Richardson (H.D.A.S.). Class Dz: 1 and 2, Mr. Enright (S.S.A.S.); 3, Mr and Mrs. Risbridger (S.S.A.S.). Class Ez: 1, Mr. Wright (S.S.A.S.); 2, Mr. Maghie (A.A.S.); 3, Mr. and Mrs. Hickman (K.A.A.). Class F: 1 and 3, Mr. Prytherch (A.A.S.); 2, Mr. Askew (S.S.A.S.). Class G: 1 and 3, Mr. and Mrs. Risbridger (S.S.A.S.); 2, Mr. Wilson (K.A.A.). Class H: 1 and 3, Mr. and Mrs. Risbridger (S.S.A.S.); 2, Mr. and Mrs. Liddle (A.A.S.). Class JK: 1, Mr. and Mrs. Hunt (A.A.S.); 2, Mr. and Mrs. Sparham (K.A.A.); 3, Mr. and Mrs. Risbridger (S.S.A.S.). Class L: 1, Mr. Renton (K.A.A.); 2, Mr. and Mrs. Liddle (A.A.S.); 3, Mr. McClurg (H.M.A.S.). Class Ma: 1, Mr. McClurg (H.M.A.S.). Class Mz: 1 and 3, Mr. and Mrs. Liddle (A.A.S.); 2, Mr. Renton (K.A.A.). Class Not: 1, 2 and 3: Mrs. Renton (N.G.L.S.). Class Nbm: 1, Mr. Richardson (H.D.A.S.); 2, Mr. Renton (K.A.A.); 3, Mr. and Mrs. Hickman (K.A.A.). Class OP: 1, Mr. Wright (S.S.A.S.); 2, Mr. Marshall (N.T.F.S.); 3, Mr. and Mrs. Ruffell (S.S.A.S.). Class Q: 1, Mr. and Mrs. Ruffell (S.S.A.S.); 2, Mr. Wynn (K.A.A.). Class R: 1 and 3, Mrs. Doughty (A.A.S.); 2, Mr. and Mrs. Liddle (A.A.S.). Class S: 1 and 2, Mr. Marshall (N.T.F.S.); 3, Mr. Wilson (K.A.A.). Class T: 1, Mr. Scott (S.S.A.S.); 2, Mr. Wright (S.S.A.S.); 3, Mrs. Renton (N.G.L.S.); Class UVW: 1, Mr. Askew (S.S.A.S.); 2, Mr. Hickman (K.A.A.); 3, Master Laidler (K.A.A.). Class Xbm: 1, Mr. Askew (S.S.A.S.); 2 and 3, Mr. Hull (T.A.S.). Class Xot: 1, Mr. Daly (N.G.L.S.); 2, Mrs. Renton (N.G.L.S.); 3, Mr. and Mrs. Risbridger (S.S.A.S.). This show was judged by Novice 'B' and 'C' class judges and prospective judges and there were 184 entries. South Shields A.S. won the trophy for the most points gained and C. Enright won the Best Fish in the Show Trophy with a apistogramma ramirezi.

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AT the **Runnymede A.S.** Open Show, Best Fish in Show was a melanochromis vermivorus, entered by K. Rees of Gosport.

The rest of the results were—Mini Furnished Aquaria: 1, P. Grosvenor (Runnymede); 2, D. Railly (Runnymede); 3, B. K. Barfery (Haslemere); 4, R. G. Hard (Haslemere). Large Barbs: 1, K. C. Smith (Runnymede); 2, R. Goodson (Roehampton); 3, R. F. Adams (Salisbury); 4, M. H. London (Tonbridge). A.O.S. Barbs: 1, J. Bayley (Sudbury); 2, M. J. Lewis (Sudbury); 3, R. Pook (Hounslow); 4, E. Fantham (Sudbury). Hyphessobrycon Hemigrammus and Cheirodon: 1, Miss R. Coyle (Independent); 2, R. Cox (High Wycombe); 3, L. J. Brazier (Sudbury); 4, J. Bayley (Sudbury). Nannostomus: 1 and 2, P. Coyle (Independent); 3, L. J. Brayier (Sudbury); 4, E. Fantham (Sudbury). A.O.S. Characin: 1, P. Coyle (Independent); 2, D. M. Reilly (Runnymede); 3, W. A. Knight (Gosport); 4, Mrs. J. Lloyds. Apistogramma, Nannacara and Pelmatochromis: 1, W. A. Cowburn (Basingstoke); 2, I. Clarke (Gosport); 3, E. Fantham (Sudbury); 4, T. Fraser (Basingstoke). Rift Valley Cichlids: 1, K. Rees (Gosport); 2, T. A. Butler (Runnymede); 3, F. McDowall (Runnymede); 4, K. Hale (Gosport). A.O.S. Cichlids: 1, R. Goodson (Roehampton); 2, A. A. Houghton (Gosport); 3, R. F. Adams (Salisbury); 4, W. A. Knight (Gosport). Fighters: 1, D. R. Fathers (Anson); 2, B. Pratt (Hounslow); 3 and 4, A. P. Taylor (Sudbury). A.O.S. Labyrinth: 1, D. M. Reilly (Runnymede); 2, T. Cripps (Basingstoke); 3, A. P. Taylor (Sudbury); 4, M. J. Lewis (Sudbury). F-o-f: 1, V. Roberts (Bracknell); 2, J. H. Jackson (Basingstoke); 3, R. J. Norris (Bracknell); 4, D. M. Reilly (Runnymede). Fz: 1, P. Grosvenor (Runnymede); 2, Miss K. Howell (Gosport); 3, P. Davies (Bracknell); 4, C. Kinslingbury (Runnymede). A.O.S. Catfish: 1, E. Fantham (Sudbury); 2, M. H. London (Tonbridge); 3, M. J. Lewis (Sudbury); 4, D. M. Reilly (Runnymede). Corydoras and Brochis: 1, Miss K. Howell (Gosport); 2, Mrs. J. Lloyds (unattached); 3, J. Shepherd (Runnymede); 4, W. A. Knight (Gosport). Rasboras: 1, K. Rees (Gosport); 2, M. J. Lewis (Sudbury); 3, P. Coyle (Independent); 4, B. Mason (Roehampton). Danio and W.C.M.M.: 1, J. H. Jackson (Basingstoke); 2, T. Fraser (Basingstoke); 3, R. Pook (Hounslow); 4, H. Nichols (Runnymede). Loach and Botea: 1, A. I. Feast (Tonbridge); 2, R. Leslie (High Wycombe); 3, A. C. Tull (Salisbury); 4, R. F. Adams (Salisbury). Labeos: 1, B. Pratt (Hounslow); 2, R. Goodson (Roehampton); 3, M. H. London (Tonbridge); 4, D. Reilly (Runnymede). A.O.S. Egglayers: 1, I. Clarke (Gosport); 2, L. J. Brazier (Sudbury); 3, J. Bayley (Sudbury); 4, C. Kislingbury (Runnymede). Egglayer (Pairs): 1, D. Reilly (Runnymede); 2, C. Kislingbury (Runnymede); 3, J. H. Jackson (Basingstoke); 4, J. Bayley (Sudbury). Livebearer (Pairs): 1, T. Fraser (Basingstoke); 2, W. West (Salisbury); 3, W. A. Cowburn (Basingstoke); 4, M. H. London (Tonbridge). Male Guppy: 1, A. P. Taylor (Sudbury); 2 and 3, C. Kislingbury (Runnymede); 4, K. Hale (Gosport). Female Guppy: 1, S. J. Rigby (Gosport Breakaway); 2, C. Kislingbury (Runnymede); 3, I. Morris

(Gosport); 4, A. E. Noronhay (Orpington). Sword: 1, E. Fantham (Sudbury); 2, G. Penrose (Gosport Breakaway); 3, R. Nichols Runnymede); 4, J. Bayley (Sudbury). Platy: 1, G. Penrose (Gosport Breakaway); 2, T. E. Burvill (Basingstoke); 3, T. Cripps (Basingstoke); 4, B. Mason (Roehampton). Mollys: 1, C. Kislingbury (Runnymede); 2 and 4, M. D. Chapman (Hampshire Independent); 3, R. J. Hard (Haslemere). A.O.S. Livebearer: 1 and 4, T. Fraser (Basingstoke); 2, E. Fantham (Sudbury); 3, T. Cripps (Basingstoke). Breeder (Egglayers): 1, R. Pook (Hounslow); 2, D. R. Fathers (Anson); 3, T. A. Butler (Runnymede); 4, M. D. Chapman (Hampshire Independent). Breeders (Livebearers): 1, A. E. Noronha (Orpington); 2 and 4, W. West (Salisbury); 3, R. Nichols (Runnymede).

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THE **Aylesbury A.S.** has enjoyed a very successful October. At the first meeting a ten-a-side match was held when each team brought along their best fish. This was a trial run for similar competitions to be held with other clubs in the area.

At the second meeting the guest speaker for the evening was Mr. Alan Robins, F.B.A.S. from Northampton who gave a very interesting and entertaining talk and slide show on the preparation and use of wood in decorative aquaria pointing out all the advantages and precautions to be taken when using old tree stumps and roots. The table show for the evening was barbs and coldwater fish, the winners being—Barbs: 1 and 3, P. Hills; 2, L. Hills. Coldwater: 1, M. Cripps; 2 and 3, D. Ellis. The club ran an excursion to the British Aquarists' Festival at Belle Vue, Manchester and had a wonderful time until the mini bus broke down in Manchester. They managed to hire a coach and arrived back safely at 2 a.m.

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AN interesting talk was given at the **South Humberside A.S.** October meeting by two of the junior members on swordtails and the piranha. Table show results were as follow—Small Barbs: 1, 2 and 3: G. Allen. Juniors—Best Fish: G. Allen. Adults—Small Barbs: 1, 2, and 3: Mr. and Mrs. Norton. Pairs (Livebearers): 1, Mr. Bromley. Large Characin: 1, Mr. Tyson; 2, R. Searby. Fighters: 1, Mrs. Kirk; 2, R. Searby; 3, Mrs. Kirk. Adults—Best Fish: Mr. and Mrs. Norton.

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THE annual general meeting of the **Association of Midland Goldfish Keepers,** was held early in November and members attended from as far as Leicestershire and Worcestershire. The Committee was re-elected as follows—Chairman: T. Roberts; Secretary: F. Orme; Treasurer: R. Hancox and Members: M. Mason and D. Denny. It was unanimously agreed that future subscriptions should be 50p for Juniors up to 16 years of age, and £1.50 for members over that age. In addition it was also agreed to continue the practice of each member pay 25p at each meeting attended.

The Foleshill Community Centre, Coventry has proved to be an ideal venue due to the easy access from the M6 motorway and it was therefore decided to hold all future bi-monthly meetings at the centre. Since the inaugural, March 1974 meeting the membership has grown to twenty-four comprising both novice and expert.

During the second half of the meeting the A.M.G.K. viewed an 8mm film, produced by T. Sutton which featured his father T. Sutton, Snr., in and around his fish house. Members witnessed the breeding preparations and subsequent spawning, feeding of the fry was shown together with the very large number of young fish raised. One particular sequence demonstrated the dangerous nature of the water tiger, and a big close-up revealed the predatory instinct of this creature as it captured a fish larger than itself.

The next meeting will be held during early January to which visitors will be welcomed and further details of the Association can be obtained from the Secretary, 94 Newman Way, Rubery, Birmingham.

MEMBERS of the **Peterborough Fishkeepers Association** expressed their sympathy at the November meeting to the wife and family of the late Mr. Tony Harris a founder and former Chairman of the Association who died recently.

The Spalding and District A.S. were welcomed as guests for the evening to hear Mr. Ilric Allen, the Chairman of the British Koi-Keepers' Society, give a talk, illustrated with film and slides, on pond construction, water filtration and koi-keeping in Japan and Britain. The Peterborough Fishkeepers meet at 8 p.m. on the first Tuesday of each month at "The Old Scarlett", Dogsthorpe, and new members are always welcome. Further information, programme etc. may be obtained from the General Secretary: C. Brakes, 62 Wisbech Road, Thorney, Peterborough, PE6 0SD.

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RESULTS of the **Blackburn Aquarist Waterlife Society** Open Show held early in November were as follow—Best Fish in Show: D. Shaw (Merseyside). Guppies: 1, Mrs. Heap (Keighley); 2, G. Gardiner (Leigh); 3, Mr. and Mrs. Muckle (Sandgrounders). Platies: 1, P. Armstrong (Heywood); 2, Mr. and Mrs. Baldwin (Sandgrounders); 3, R. W. Carter (Merseyside). Swordtails: 1, R. I. Payne (Merseyside); 2, D. P. Birdsall (Aireborough); 3, Mr. and Mrs. Baldwin (Sandgrounders). Mollies: 1—Section: Mr. and Mrs. Holmes (Castlefored); 2, J. Ridley (Heywood); 3, D. Hugh (Huddersfield). A.O.V. Livebearer: 1 and 3, D. P. Birdsall (Aireborough); 2, Mr. and Mrs. Bond (Sandgrounders). Small Characins: 1, P. H. Batchelor (Loyne); 2, Mr. and Mrs. Muckle (Sandgrounders); 3, Mr. Bamber (Sandgrounders). Large Characins: 1, A. Frisby (Hull); 2, K. Wright (Sandgrounders); 3, Mr. and Mrs. Houghton (Sandgrounders). Dwarf Cichlids: 1, A. Gregory (Nelson); 2, Mr. and Mrs. Holmes (Castleford); 3, B. Howson (Blackburn). Large Cichlids: 1, D. Buckley (Heywood); 2, A. Axon (Ashton); 3, J. A. Whiteley (Aireborough). Angels: 1 and 2, A. Axon (Ashton); 3, M. Wild (Accrington). Small Barbs: 1, J. A. Whiteley (Aireborough); 2, V. Hough (Huddersfield); 3, P. Armstrong (Heywood). Large Barbs: 1, Mrs. Rawlings (Castlefored); 2, T. Nickolfored (Sherwood); 3, Mrs. Holmes (Castleford). Toothcarps: 1, R. Payne (Merseyside); 2, A. Manser (Sandgroounders); 3, Mrs. Heap (Keighley). Minnows: 1, J. A. Whiteley (Aireborough); 2, R. J. Stevens (Blackburn); 3, J. Furness (Castleford). Danios: 1, Mrs. Povey (Sheaf Valley); 2, Mr. and Mrs. Burton (Blackburn); 3, T. Mellings (Blackburn). Rasboras: 1, C. Norton (Sandgrounders); 2, Mr. and Mrs. Muckle (Sandgrounders); 3, J. A. Whiteley (Aireborough). Fighters: 1, B. and M. Crabtree (Independent); 2, Mr. Davies (Heywood); 3, L. Smith (Castleford). Anabantids (up to Thicklip): 1, Mrs. Rawlings (Castleford); 2, Mrs. Jervis (Sandgrounders); 3, P. S. Gudgeon (Hyde). A.O.V. Anabantids: 1, C. Norton (Sandgrounders) 2, A. Gregory (Nelson); 3, Mrs. Gudgeon (Hyde). Sharks: 1, R. I. Payne (Merseyside); 2, Mr. and Mrs. Rawlings (Castlefored); 3, T. Nickolson (Sherwood). Foxes: 1, J. A. Whiteley (Aireborough); 2, M. Wild (Accrington); 3, D. Hough (Huddersfield). Breeders (Livebearers): 1, J. Etoe (Sandgrounders); 2, A. Manser (Sandgrounders); 3, J. Furness (Castleford). Breeders (Egglayers 1 to 10): 1, J. Furness (Castlefored); 2, Mrs. Brown (Accrington); 3, A. Vassiere (Merseyside). Breeders (Egglayers 11-20): 1, S. Hooton (Sandgrounders); 2, L. Smith (Castlefored); 3, A. Vassiere (Merseyside). Pairs (Livebearers): 1, J. A. Whiteley (Aireborough); 2, Mrs. Holmes (Castlefored); 3, Mrs. Bond (Sandgrounders). Pairs (Egglayers): 1 and 2, C. and B. White (Leigh); 3, Mr. Bamber (Sandgrounders). Loaches: 1, P. Armstrong (Heywood); 2, Mrs. Muckle (Sandgrounders); 3, D. A. Wilkinson (Fleetwood). Corydoras: 1 and 3, P. H. Batchelor (Loyne); 2, B. and C. White (Leigh). A.O.V. Catfish: 1 and 3, P. H. Batchelor (Loyne); 2, Mr. and Mrs. Bond (Sandgrounders). A.O.V. Juniors: 1, H. Johnson (Hyde); 2, Mr. Yates (Middleston); 3, A. S. Furness (Castleford). A.O.V. Tropical: 1 and 3, P. H. Batchelor (Loyne); 2, A. Barrett (Castleford). Common Coldwater: 1 and 2, A. Frisby (Hull); 3, D. Wolstenholme (Blackburn). Fancy Goldfish: 1 and 3, H. Phillipson (Middleson); 2, S. Foote (Accrington). A.O.V. Coldwater: 1 and 2, S. Walsh (Accrington); 3, P. Hinchey (Loyne). Marine: 1 and 2, D. Shaw (Merseyside).

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DURING October **Bradford and District A.S.** members at the two meetings were entertained to a quiz and a film and slide show. For the latter the idea was that any member who took his camera with him on the outing to Chester Zoo would be able to show the rest of the Society the successful slides that he was able to take and this provided a good evening's entertainment. The secretary of the Society is Mrs. R. Cawthra, 74 Hastings Avenue, Bradford 5.

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THE largest number of members and guests for a considerable time attended the November meeting of the **Goldfish Society of Great Britain.**

The main theme of the afternoon was a slide show with over 120 coloured slides of Japanese fish keeping, presented by Alan Lawman who recently visited Japan. The sole purpose of Mr. Lawman's visit to Japan was to meet and talk with the most famous non-commercial breeders and he was probably the first English person to do just that. He spoke of the breeding methods of such famous people as Mr. Sakuri, Mr. Uno, Mr. Watanabe, Mr. and Mrs. Takahashi and Mr. Ishitana whose great grandfather perfected the Ranchu. The members were surprised to learn that 90% of Japanese goldfish breeders only keep two varieties: Ranchu (Lionhead) and Azumanishiki (Calico Oranda) and that the average breeder spends upwards of £5.00 per day feeding his fish on blood worms. The huge audience was not disappointed and many expressions of appreciation were heard as the pictures of fantastic goldfish were shown on the screen.

There were on display twenty fish owned by judges and the members were invited to judge the fish and select the best specimen. This proved to be a fish owned by A. Law.

The Goldfish Society of Great Britain meetings for 1975 are as follows and will be held at Conway Hall, Red Lion Square, Holborn on: 18th January, 22nd March (A.G.M.), 24th May, 26th July, 22nd November. No date has been fixed yet for the Open Show.

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OBITUARY

The death is announced of Mr. Scott Morgan, President of the **Bournemouth A.S.** who died suddenly at the end of October. He was greatly respected and was the Society's President for fourteen years. A regular entrant to the Southern Area open shows in which he enjoyed a large amount of success, his passing is a great loss to the Society.

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SECRETARY CHANGES

Southampton A.S.: D. Mills, 30 Fernderne Way, Bitterne Park, Southampton.

Lincoln District A.S.: Mrs. S. Woodliffe, "Sandown", 36 Richmond Road, Lincoln LN1 1LQ.

Washington A.S.: H. G. Whyatt, 1 Tyneview Gardens, Pelaw, Gateshead 10. *Show Secretary:* W. Hall, 17 Gladstone Terrace, Washington, Co. Durham.

Newbury District A.S.: Mr. Hulford, 21 Meyrick Drive, Wash Common, Newbury, Berks. Tel: Newbury 4692.

British Cichlid Association: T. Green, 12 Greenwood Meadow, Chinnor, Oxford.

Kettering A.S.: Mrs. M. Hogwood, 4 Albion Road, Kettering, Northants.

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NEW SOCIETIES

A new society, chaired by Mr. G. T. Liddle, has been formed on Tyneside. The **Bimbi Aquatic and Study Society** meets fortnightly at 7.30 above the Bimbi Fish Restaurant, Durham Road, Birtley. The first meeting was held on Thursday, 17th October. For further details please contact the Secretary: Mrs. P. J.

Archdale, 47 Aberfoyle, Ouston, Chester-le-Street, Co. Durham DH2 1RH. Tel. Birtley 4307.

The **Snaith and District A.S.** has been formed and the officers elected are—Chairman: T. Wilkinson; Treasurer: F. Humphrey; Secretary: T. Price. Meetings are held every other Thursday at the "Country Club", Snaith from 31st October, 1974 at 7.30 and everybody is welcome at the meetings. Those wishing to join please contact: T. Price, 9 Westfield Avenue, Eggborough, Goole. Tel: Whitley Bridge 707.

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AQUARIST CALENDAR

23rd February: Retford and District A.S. First Open Show, venue to be announced shortly. Schedules from Show Secretary: B. D. Chester, 7 Rose Lea, Ordsall, Retford, Notts. Tel: Rampton 594.

2nd March: Keighley A.S. 7th Annual Open Show at the Leisure Centre, Victoria Park, Keighley. Benching 12—2 p.m.

16th March: Don Valley A.S. Open Show, Staff Dining Rooms, British Steel Corporation, Stockbridge, nr. Sheffield Works. Schedules from Show Secretary, Mrs. B. Hartley, 11 Hall Royd Walk, Silkstone Common, Barnsley.

31st March: Southampton A.S. Open Show will be held at the Avenue Hall, The Avenue, Southampton. Schedules available from Mr. D. Mills, 30 Ferndene Way, Bitterne Park, Southampton.

6th April: Medway A.S. Annual Open Show. Further details later.

6th April: Heywood and District A.S. Open Show, Civic Hall, Church Street, Heywood, Lancs.

13th April: Nelson A.S. Annual Open Show, The Civic Centre, Stanley Street, Nelson. Details from: R. McKenna, 52 Bath Street, Nelson BB9 0NP, Lancs.

19th April: Corringham and District A.S. Annual Open Show. Further details to follow.

20th April: Coventry Pool and A.S. Open Show at Templars Junior School, Tile Hill Lane, Coventry. Show schedule (s.a.e.) from S. Wooldridge, 23 Lime Tree Avenue, Tile Hill, Coventry.

20th April: Merseyside A.S. Open Show, Rainhill Village Hall, Exchange Place, Rainhill, Lancs.

27th April: Loyne Aquarist Open Show at St. Paul's Hall, Scotforth, Lancaster.

10th May: Southend, Leigh and District A.S. Open Show, St. Clements Hall, Leigh-on-Sea, Essex. Club Furnished, Individual Furnished, Aquascapes, Marine and Junior Classes included. Show Secretary: Derek Durrant, 172 Trinity Road, Southend-on-Sea, Essex. Tel: 610576.

11th May: Bournemouth A.S. Annual Open Show to be held at Kinson Community Centre, Pelhams Park, Kinson, Bournemouth. Show Secretary: J. V. Jeffrey, 30 Braemar Avenue, Southbourne, Bournemouth BH6 4JF.

18th May: Goole A.S. Open Show. Show Secretary, P. Shipley 76 Jefferson Street, Goole, N. Humberside DN14 6SJ.

18th May: Middleton and District A.S. Fourth Open Show will be held at Hollin High School, Hollin Lane, Middleton. Schedules later. Only members of recognised Aquarist Societies may exhibit. No independent entries can be accepted.

25th May: Corby and District A.S.: Open Show, Corby Civic Centre, Corby, Northants. Show Secretary, A. Slow, 176 King Street, Kettering, Northants NN16 8QS. (Details and Show Schedule Mid-March).

1st June: Newcastle Tropical F.S. Open Show will be held in St. John's Church Hall, Westgate Road and Grainger Street junction, Newcastle upon Tyne. Schedules will be available shortly from L. R. Lawson, 84 Grosvenor Road, Jesmond, Newcastle upon Tyne 2.

22nd June: Hinckley and District A.S. 4th Open Show will be held at Westfield Community Centre, Rosemary Way, Hinckley. Schedules from: W. Fielding, 15 Council Road, Hinckley, Leics.

20th July: Sandgrounders A.S. Annual Open Show at Meols Cop Secondary Schools, Meols Cop Road, Southport. Show Secretary: G. A. Waterhouse, 23 Moss Lane, Southport, Merseyside PR9 9QR.

10th August: Grimsby and Cleethorpes A.S. Open Show Memorial Hall, Cleethorpes. Schedules from: Show Secretary—T. P. Walker. 51 Cheshire Walk, Grimsby, South Humberside.