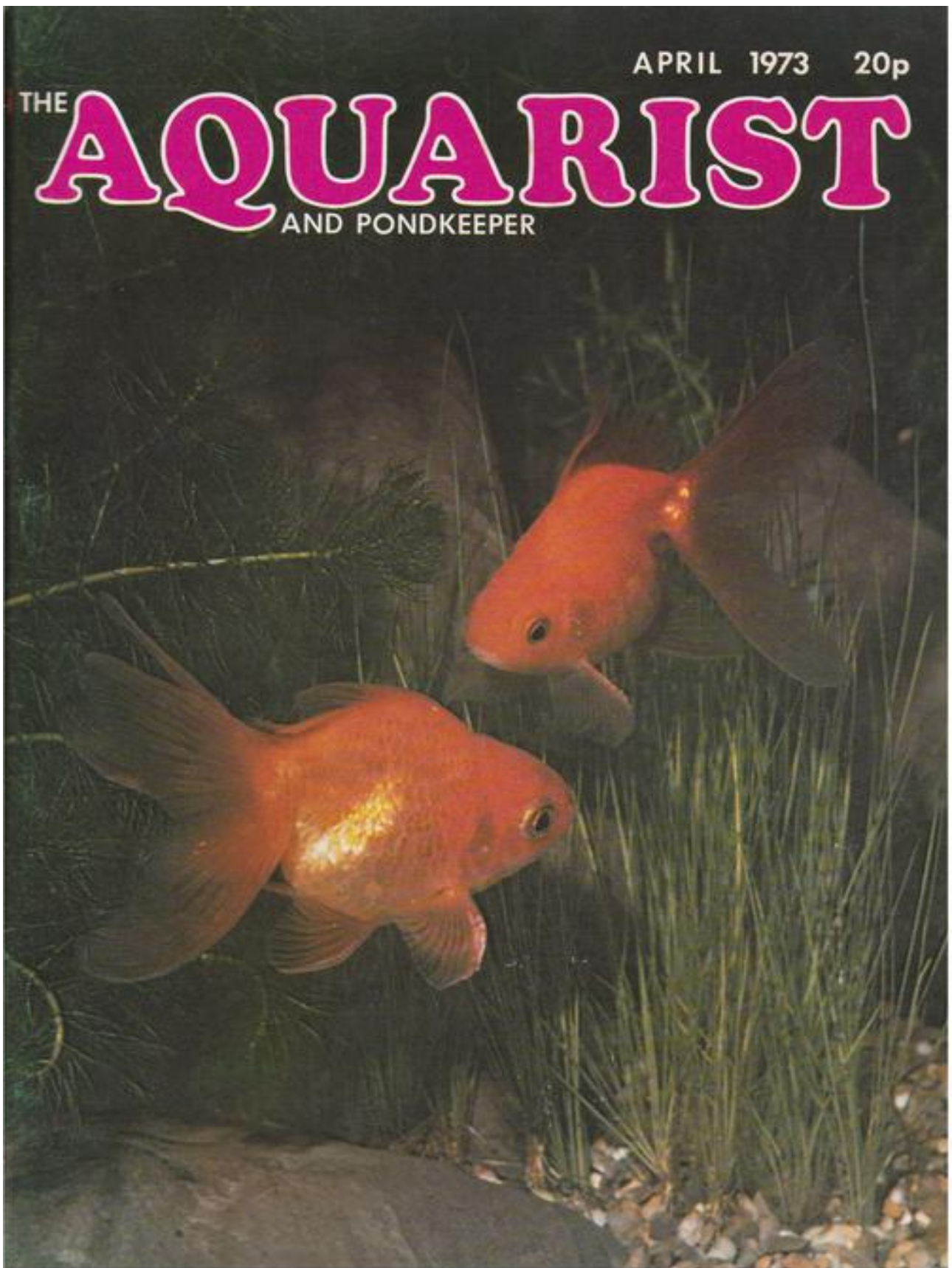


APRIL 1973 20p

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A general view through one of three walk-throughs seen from the quarantine section looking beyond to the sales area.



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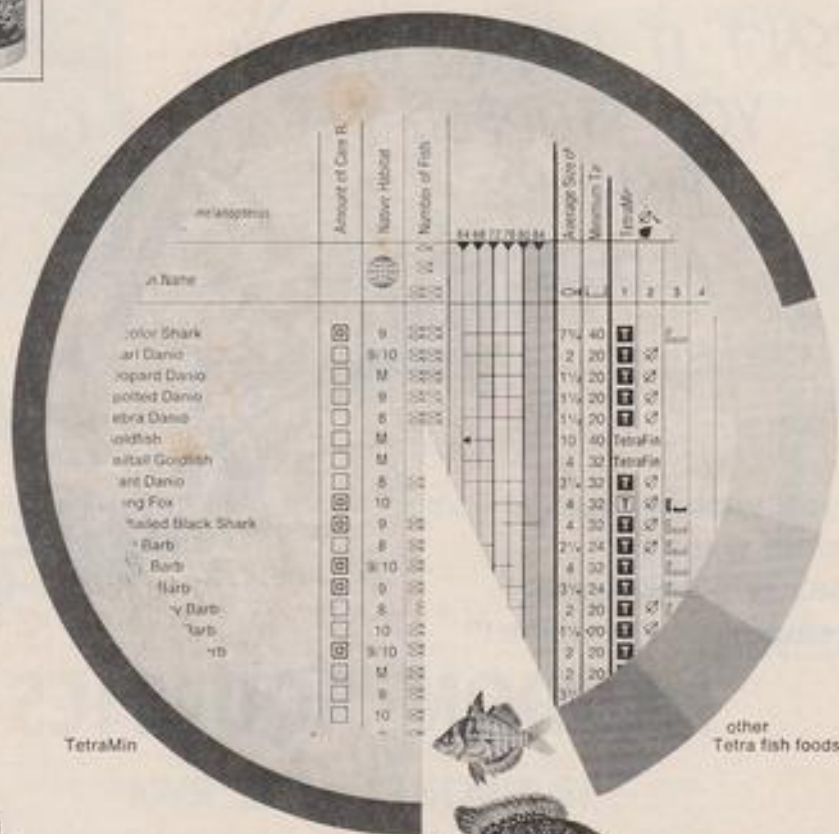
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£1.20



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63p



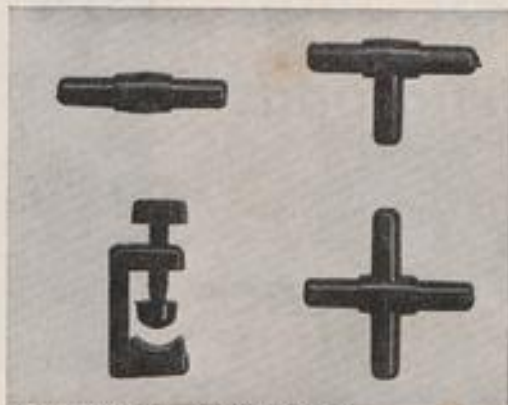
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The power lift can be used in conjunction with the Windmill Biological Filter to increase the rate of water turnover.

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Two 18-in. filters for a 36-in. tank. Two 24-in. filters for a 48-in. tank

Manufacturers:

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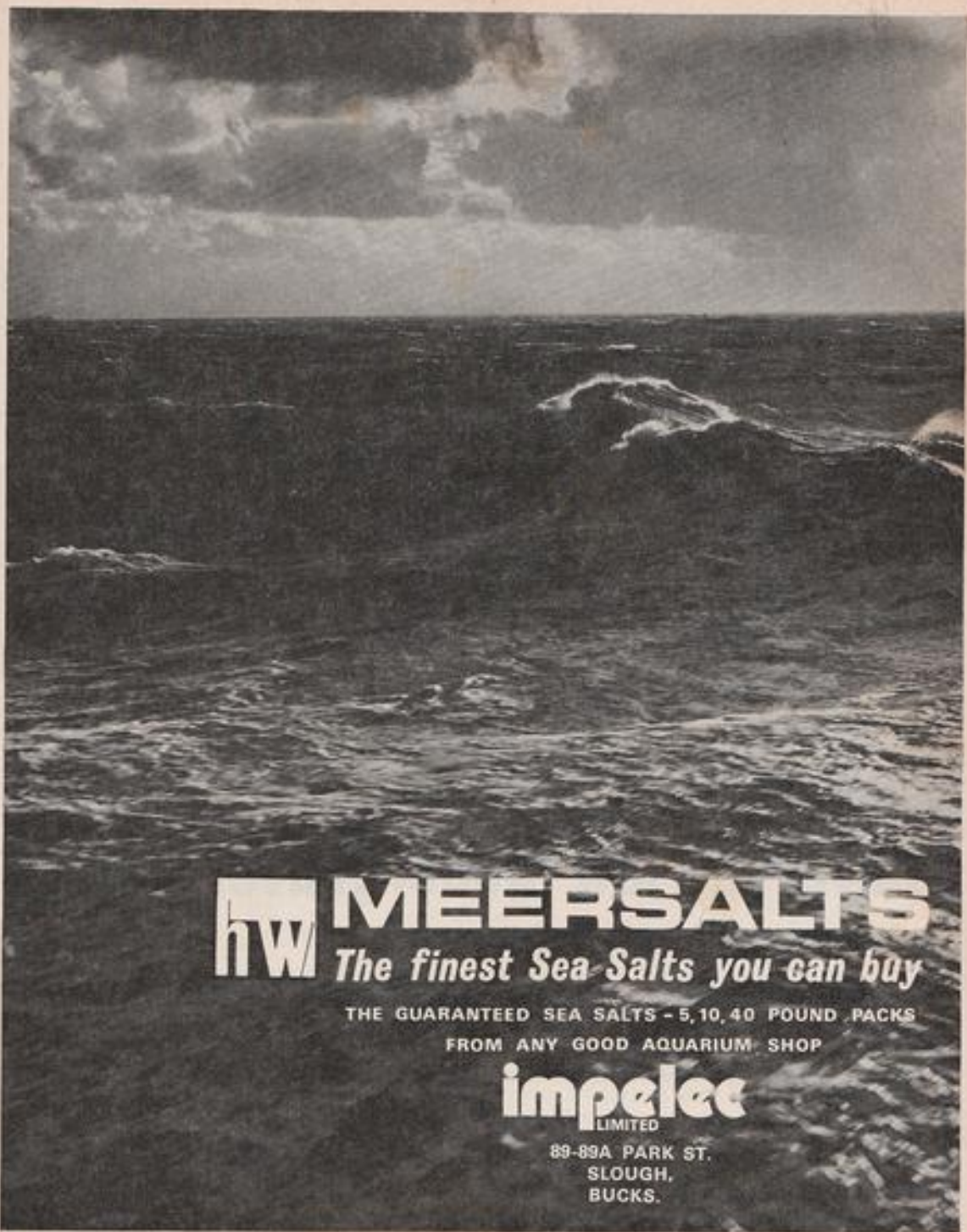
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XV



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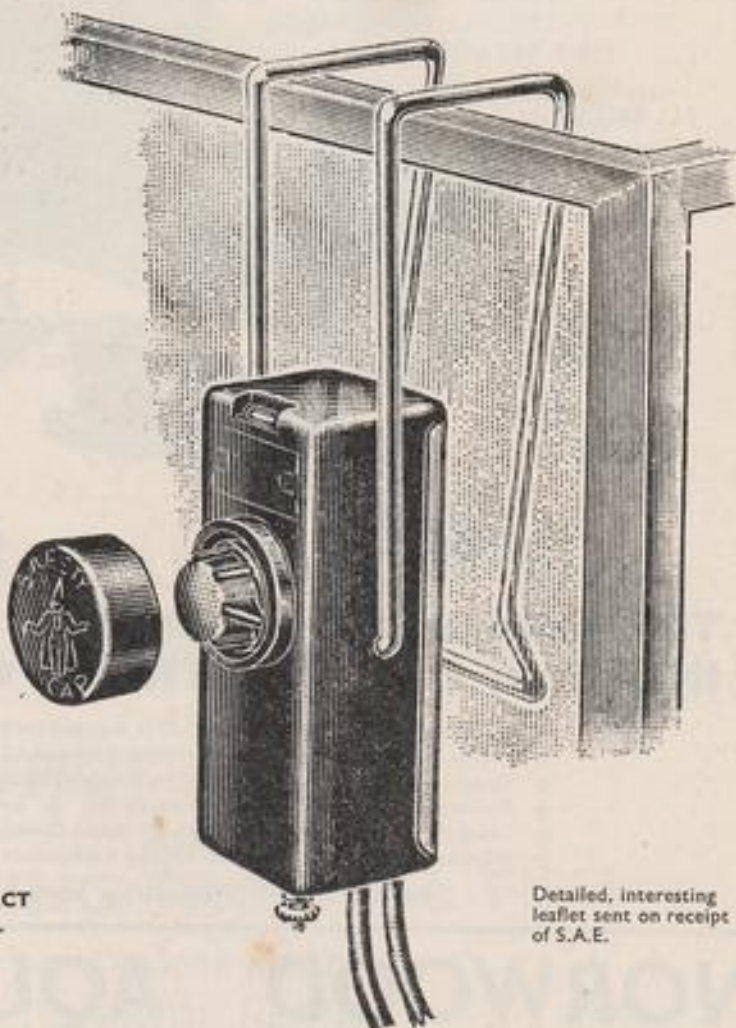
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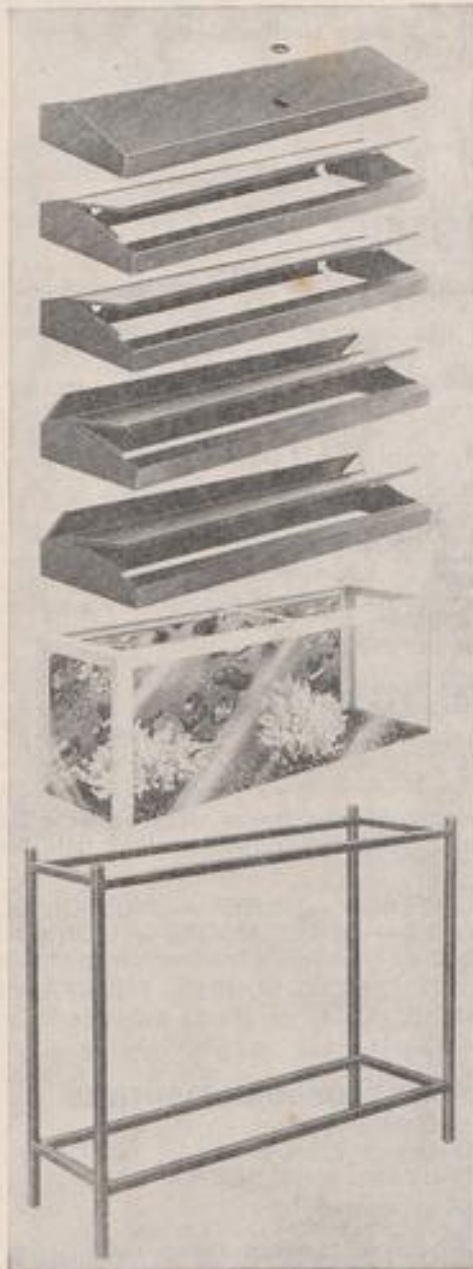
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Our Cover
Fantail Goldfish

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The Editor accepts no responsibility for views expressed by contributors.

April, 1973

1

Coldwater Fishkeeping

FISH LOSSES IN THE GARDEN POND

by A. Boarder

THE GARDEN POND has become far more popular during the past three years or so, mainly because of the introduction of the plastic lining used in the construction of ponds. This has meant that a pond can be made without the chore of mixing and laying concrete. Whether the former will last as long remains to be seen. One of my ponds, made with concrete in 1937, has never shown the slightest crack or has leaked in any way. The cheaper types of plastic linings may not last as long, but the Butyl linings can possibly do so, although only time will tell. With the easy-made pond encouraging many more people to take up the fascinating hobby of fishkeeping, it is certain that many of them have little knowledge as to how to maintain the pond in good condition. Many people start with a pond with no experience at fishkeeping at all and it is only when something goes wrong that they seek advice or take the trouble to read any books on the subject.

If only such enthusiasts would make an effort to get some information first, a great deal of trouble and heart-ache could be saved them later on. There are a few happenings which most pondkeepers experience soon after the start with the hobby. I think that the first and certainly most common one is the greening of the water. This is only a natural happening and need not cause undue worry. Any water exposed to the

light will soon turn green through the air-borne *algae*, a tiny plant which, if troublesome, will give off oxygen for the benefit of the fishes. However, it can get too thick and obscure the occupants of the pond. The remedy is to have plenty of underwater oxygenating plants, as these tend to shade out much of the light, and water lily leaves will do so better than ever once they cover a fair proportion of the surface.

Apart from some troubles which may arise when the pond is stocked, there is little else to worry over. One of the first faults of the beginner is to try to have too many fishes in the pond. Some people feel that unless they have crowds of fish in the water their pond will not be a success. Nothing will bring trouble more quickly than over-crowding. A few healthy fish will be a joy to behold, whereas too many will almost certainly mean that the weaker will go to the wall and the others will not thrive as well as they should do. It would be difficult to state categorically as to the correct number of fish for each pond. Ponds vary so much in depth, size and location, but a pond about 10 feet by six can hold a dozen three-inch fish and they would then have plenty of swimming space in which to grow and possibly breed. Once the fish are in the pond the next fault is over-feeding. Most beginners just cannot refrain from feeding their fish every time they go near the pond. Just because the fish might

come to the surface it does not signify that they are hungry—it is often just a force of habit. Make no mistake, a hungry goldfish is usually a healthy one. Goldfish in a properly planted pond will not go short of necessary food, as they can eat from the water plants and they can almost always find something either vegetable or animal in the water in the form of food.

How much food should be given at a time? This is the usual question and one which is not easy to answer. So much depends on the condition and age of the pond. A well-established pond may provide plenty of food, whereas the newly constructed one may not have got to that stage of maturity when there is always some form of fish food present. No food should ever be offered if the slightest piece of food remains from the previous feeding. A feeding ring is very useful for a start, as it does mean that one can feed in the same spot every time and it can be seen if it has been eaten or not. The fish will gather at this spot when food is required and so one can get a good idea as to when to feed again. Only give the smallest amount at first, and if this is not taken immediately, no more should be given that day.

Once the pond is functioning well it can look after itself to a certain extent and it is only the occasional feed which is needed to keep all going well. However, there are one or two happenings which can mar the situation and if one is aware of the possibilities it does help to prepare one for such contingencies. I refer to pests. The possible pests can be varied and range from the neighbour's cat to certain birds. Some cats are proficient catchers of fish and once a cat gets the taste of a goldfish it can become a constant visitor to a garden pond to the detriment of the occupants. There are a few methods for deterring such fishing cats and either of them can be tried if the occasion arises. If a cat is known to visit a pond it may be possible to make a small trench around the pond which is continually filled with water. Although a cat may dip its foot into a pond to catch a fish, it does not like walking through water to get to the pond and such a wet trench can be a deterrent. Another idea is to have a wall around the pond so that a cat could not reach the water from it. Where there is only a spot or two where a cat could reach the water it is possible to lay a few large tiles round the edge of the pond. These should overhang the water so that when a cat walks on to the tile it will tip up and shoot the cat into the water. This will be a lesson the cat will never forget. It must not be thought that the cat will suffer any injury, as cats can swim as well as dogs, but the ducking will not be to the liking of your four-footed friend.

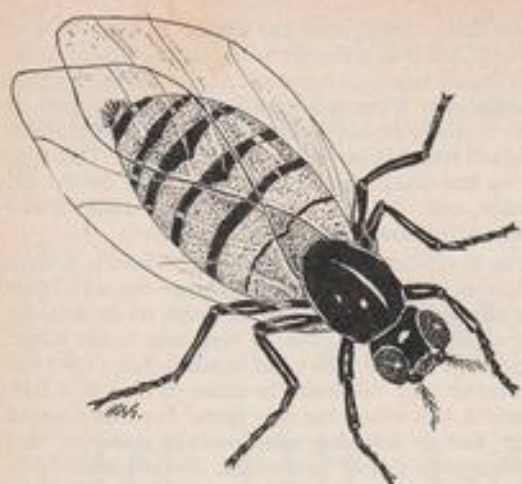
As for visits from birds, there are several which can be a nuisance and I suppose the worst one is the heron. This bird is a very proficient fisher but is not likely to be of much a worry in town areas. Once a

heron finds a fishpond it can clear it of fish in a few days. If one is in a district where these birds are seen then certain steps can be taken. It is usual for a heron to alight near water and then walk into it in order to fish. A trip-wire can be fixed about a yard from the pond, all round it, at a level of about a foot. This wire can be fine black wire as used to be used on the old wireless coil. This is less conspicuous than having plastic wire frames over the whole pond.

The kingfisher will visit the pond if there is a river or lake in the vicinity and these birds can take fishes of a fair size. This bird likes to perch on an adjacent post or similar object, over or very near to the water. It can then dive into the pond to take a fish. They can also hover over the water in order to dive at a fish. However, it is a fact that they prefer to perch near the water and so anything which would make an easy viewing place should be avoided. Several other birds not so well known as fishers can also take fish. The barn owl is a rare visitor to a pond and I have lost a fish through one which came during a moonlight night and took one of my large fish. The crow is another bird which has been known to take goldfish from a pond and so if any are seen near, it would be well to fix up a scare of a kind to keep crows away.

One of the most unlikely birds to eat young fish is the blackbird. One would hardly expect one of these to take fish, but I have had a large number of losses through blackbirds. I had often seen them at my ponds taking frog tadpoles, and had not been very worried, as I like their song so much that I could forgive them for taking a few tadpoles. However, worse was to follow. I have a large garden frame which is 20 ft. x 7 ft. and raised from the ground on bricks and concrete. The frame is made with concrete framework but has 12 3 ft. timber lights. These are kept partly open during the day for fresh air. In the frame I have a number of concrete hatching tanks and in these I was rearing about 150 young fantails, the pick of the season's fry. They were about an inch or just over in length. I found that they were gradually disappearing, but yet I never saw a dead fish nor one in trouble. Keeping watch for a time I saw two or three blackbirds inside the frame and my problem was answered. These birds had been attracted inside the frame by flying ants, and after feeding on them they had found the young fish, perhaps having got the appetite through eating the tadpoles. Whatever the reason the birds took every fish in the six tanks.

This may seem like a tale of woe, but this is the first time this has happened to me in 34 years. It is quite possible for a pondkeeper to go through years and never get any of the pests I have quoted, but it is just as well to be prepared. Forewarned is forearmed and if my experiences help anyone to make some provisions against the possibility of visits from such pests my warnings will not have been in vain.



MAINTAINING SUPPLIES OF FRUIT FLIES

by H. G. B. Gilpin

A DIFFICULTY much in the minds of herpetologists during the breeding season is the provision, in sufficient quantities, of insects small enough to meet the needs of newly-born lizards and tiny frogs and toads, recently emerged from the tadpole stage. Minute insects can be collected by shaking bushes over a sheet spread out beneath them but this is a wearisome business which must be performed regularly and frequently if enough food is to be obtained to satisfy the requirements of even a limited number of hungry babies. This source, too, is unreliable as its success depends upon factors such as varying weather conditions beyond one's power to control.

Fortunately an insect, capable of maintenance with very little trouble in confinement and which will reproduce freely under controlled conditions, is available to reptile breeders. This is the Fruit Fly, *Drosophila melanogaster*, a tiny winged fly commonly to be seen during the summer crawling over and flying around rotting fruit.

Fruit Flies are readily obtainable from most biological supplies firms who market them in response to the demands of schools, colleges, etc., for these insects where they are used as experimental animals in the study of the Mendelian principles of heredity.

The natural insect known as the Wild Type, has a dark banded, yellow abdomen, deeper coloured at the apex in the male than in the female, long veined wings and red eyes. Further distinguishing features between the sexes are the shape at the end of the abdomen and the presence of a comb of black hairs on the fronts of each of the first pair of legs in the male which is absent in the female.

Mutations from the normal are available and these include the Vestigial Wing, which has a dark body, red eyes and wings so shrivelled it is unable to fly, the Black-bodied Ebony, the Sex-linked White Eye, the red eyed Scarlet Eye, the White Eye Minia-

ture Wing, with wings shorter and darker than normal, the Brown Eye, which has light brown eyes, the Bar Eye, identified by a narrow vertical strip eye and the White Eye Miniature Wing Bar Eye.

From the point of view of the herpetologist the Vestigial Wing is by far the most satisfactory fruit fly. Initially I made the mistake of introducing the Wild Type into a vivarium. Many of these, by reason of their small size, were able to escape through tiny gaps between the lid and top of the vivarium and create something of a nuisance about the house. Other vivaria containing Vestigial Wings present no such problem. Where the Wild Type has been originally introduced it is necessary to make sure they have all disappeared before replacing them with Vestigial Wings as the Wild Type is dominant to all varieties except the Bar Eye and if only a few of the Wild Type remain future generations will be likely to contain many free-flying insects.

Fruit flies are easily maintained on an artificial nutrient material, made by pouring 100 ccs of molasses on to 200 ccs of maize meal. A trace of Nipagin, obtainable from most biological suppliers, is then added and the whole moistened and thoroughly mixed together. This is then stirred into a hot solution of five grams of agar agar in 200 ccs of water. The mixture is gently heated, stirring to avoid burning, for eight minutes and poured, while still hot, to a depth of one inch into a series of sterilised bottles. One third pint milk bottles are a convenient size and shape for this purpose. These appear to have been discontinued by the trade and some dairies are willing to provide them for this purpose.

After the medium has cooled and solidified a small piece is cut from its circumference, forming a gap between it and the side of the glass to allow the escape of any gasses formed by fermentation. Previous to the installation of the flies a roughly shaped cone

of absorbent paper, such as a paper towel, is placed in the bottle so that it reaches from the food at the bottom almost to the top to remove any undue moisture and to provide a climbing space for the insects. The neck of the bottle is closed with a wad of cotton wool.

Fruit flies follow the typical reproduction cycle common amongst most insects. Eggs are laid and in due course hatch into tiny *larvae*. These, after a period of intensive feeding, pupate and finally the fully adult flies emerge from the *pupae*. The female flies produce their eggs twelve hours after they leave the pupal cases and the males are capable of fertilising them after a few hours.

Fruit flies are usually purchased in small tubes and on arrival they should at once be transferred to a bottle containing food medium to which has been added immediately preceding their introduction, two or three drops of yeast suspension in water. The tiny eggs, each bearing two filaments, are deposited on the surface of the food. They soon hatch and the *larvae* burrow into the food, feeding continually

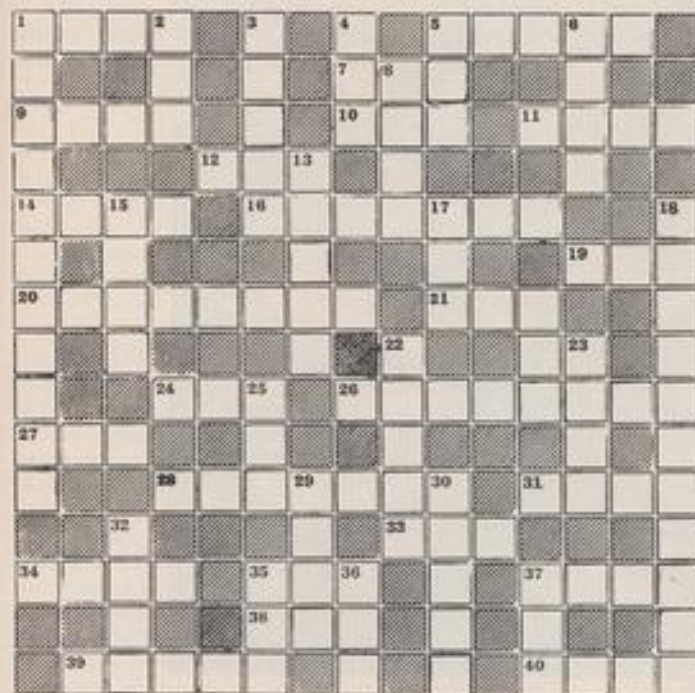
and moulting twice before leaving the medium and and darkening in colour prior to pupation. Approximately 14 days after the eggs are laid the imago appear.

As soon as a reasonable number of flies are observed crawling over the absorbent paper, I transfer some of them to a second bottle previously prepared for their reception, to serve as a breeding unit for the next generation. The movement of insects can be brought about by removing the cotton wool plugs and holding the bottles neck to neck, the second bottle being above the first one. As soon as enough insects have entered the second bottle, the plug is replaced. The original bottle is then put into a vivarium where it will provide the inhabitants with a supply of insects for the next couple of weeks.

Fruit flies will reproduce satisfactorily in any warm room or cupboard but do best at a constant temperature of 23°C. Personally I achieve this by standing the rearing bottles in an old aquarium heated by a 25 watt bulb suspended from the lid.

The AQUARIST Crossword

Compiled by M. J. Ellick



Solution on page 29

CLUES ACROSS

1. Precious stone (4).
2. See 29 down.
3. Long time (3).
4. Colour lightly (4).
5. Ned terminates (3).
6. True ones required for breeding (4).
7. Young lion (3).
8. Needed for *Ichthyophonus* (4).
9. Type of beetle (7).
10. Heavenly body (3).
11. Millions fish (8, 11).
12. Metal obtained from *Barbodes ichuanensis* (3).
13. Long-eared quadruped (3).
14. Usually a pugnacious family (8).
15. Water container (3).
- 16 & 17 across. *Barbus lateristriga* (7, 4).
18. Scandinavian god (4).
19. Used for catching fish (3).
20. A good one will win the breeders' class (4).
- 21 & 22 down. Dairy producers of the sea? (3, 4).
23. See 28.
24. Single (3).
25. *Niphargus maculatus* (5).
26. Narrative (4).

CLUES DOWN

1. See 20 across.
2. As late as nose (3).
3. Garden bush (5).
4. Enclosed for a reply (3).
5. Boy's name (3).
6. Thoroughfare (4).
7. Small insect (4).
8. Flesh support (5).
9. Steals from (4).
10. Floor covering (3).
11. What white spot in the tank is (11).
12. This cat is also a barb (5).
13. See 35 across.
14. Health resort (3).
- 15 & 16 across. *Myphasmaeum inned* (4, 5).
17. Rustler rutilar (5).
18. Caudal fin (4).
19. Shy (3).
20. What all fish must be (3).
21. Club got from *Panax orbicularis* (3).

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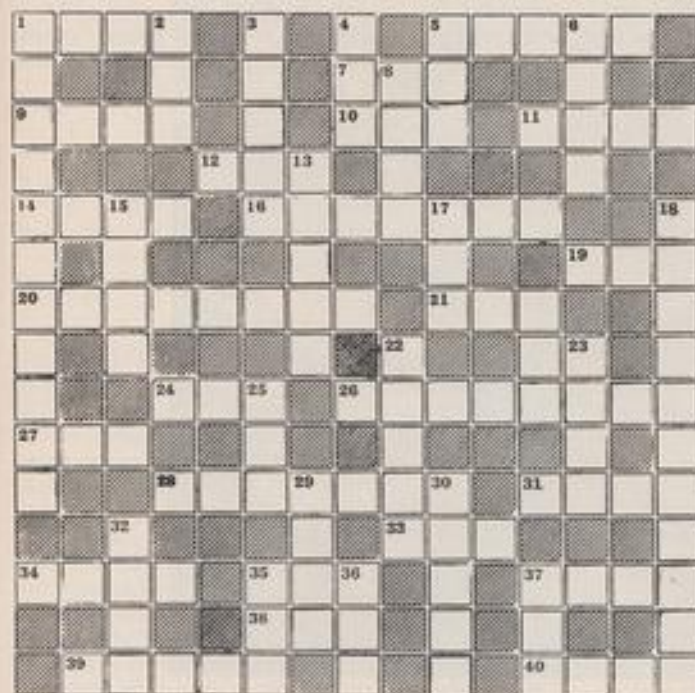
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PLANTS IN THE MARINE AQUARIUM

by Roger Lubbock & Richard Sankey

photographs by Roger Lubbock

AN INTEGRAL part of any decorative tropical fresh-water aquarium is the plant life, which forms a natural background for the animal inhabitants. It would, therefore, follow that the same would apply to the

marine aquarium. Many authors, however, have suggested the use of bleached corals and rocks as a decorative substitute since marine plants "cannot be kept." The purpose of this article is to show



Angiosperm, *Halophila Spa* collected in the northern Red Sea by R. Lubbock.

that some marine plants can be successfully kept in tropical marine aquaria and that furthermore they are as important biologically as their freshwater counterparts.

When one speaks of marine plants one is, in fact, referring normally to complex *algae*, as there are very few marine angiosperms. The individual aquarium requirements of these *algae* may vary somewhat, but there are nevertheless several unifying factors which control their growth and development. The first essential for plant growth is light, which enables photosynthesis. It is clear that the best light source will approximate to sunlight, or at least those parts of the spectrum which penetrate underwater. The intensity and duration of this light will determine the rate of growth, and by varying the amount,

Also in "Das Meeressarium," Wickler suggests a formula for nutrient solutions. Most plants are sensitive to copper sulphate and other fish remedies.

The marine plants that we have kept and observed to date fall into five broad categories, which we list below:

1. *Simple algae*: This category includes filamentous green forms as well as green, brown and red types, which form mats on rocks, coral, glass, etc. These are by far the easiest to grow and are often found in even the most unnatural aquaria; the amount and nature of the light governs which species will predominate, and selective control can be affected by adjusting the light source. Under the right conditions these will appear by themselves and are generally desirable, unless they start overgrowing other



Caulerpa prolifera from the northern Red Sea.

will affect a selective growth of *algae*. In many cases it is difficult to apply sufficient natural light and so it is necessary to resort to artificial sources. In our experience we have found the use of white fluorescent tubes, combined with tungsten halogen, to be by far the best, although white tubes are moderately successful. Incandescent bulbs appeared only to encourage the growth of brown *algae*. The *algae* absorb nutrients from the water, principally nitrates and phosphates. The aquarium nitrates result indirectly from the excretion of fishes and, therefore, need not be added. Indeed, it is often unnecessary to add any form of algal nutrient. However, there is a variety of commercially prepared additives and some of these do appear to have a beneficial effect.

more interesting plants or sessile invertebrates. They are a good natural food source for many herbivorous fish (e.g., *Acanthurus*, *Zebrafish*, *Euxenius*, *Salarias*) and some angels (e.g., *Centropyge*).

2. *Complex algae*: Some of the more common complex *algae* that are available to the aquarist are species of the following genera, *Caulerpa*, *Halimeda*, *Codium*, *Valonia*, *Ulva*, *Udotea* and *Pencilus*. Of these the two former are perhaps the most common and readily grow under good conditions.

The actual amount of lighting should be regulated so that growth is achieved without the plant

Continued on page 9

From a Naturalist's Notebook

by Eric Hardy

VISITING the aquatic plant-section at the Royal Botanic Gardens at Kew recently, to prepare a talk for our local aquarist society, I was interested to see the Cheshire classic, *Cotula coronopifolia* or South African yellow button grown as a submerged plant. It does equally well in damp soil and is perennial in Cheshire where it fills the dyke between Meols Common and the old Leasowe Lighthouse near the Wirral coast, keeping its flowers and light evergreen, small, strap-like leaves into a mild winter like this. This is its only abundant British haunt, having been established by Lady Cust's gardener from nearby Leasowe Castle before 1885.

Another interesting Cheshire rarity growing at Kew is the very slender, shiny narrow small reed, whose spikey, purplish-green flowerheads I have seen in mid-June at the swampy north-east (Delamere) end of Oakmere, among the common beaked sedge in a very reedy inlet by the fir-trees. Kew got their plants from the classic Scottish haunt Loch Neagh, Caithness, and grow it in the gravelly bank. It grows abundantly in the Leven Canal in east Yorkshire and at Poors Fen at Hockham Rough in Norfolk. A cultivated Irish variety has quite flat leaves. They also had pennyroyal, *Mentha pulegium*, from its classic Sussex site at Scaynes Hill where drainage has greatly reduced it.

I was also interested to see at Kew the dirty-white (*alba*) variety of our native yellow flag, a form I've never seen in the wild; this originated in cultivation. There's also a primrose yellow variety of this, called *bastardii*, and a darker yellow *variegatus* difficult to distinguish from *aureus* and reverting to the native parent. Incidentally, a pinkish-purple flag, *Iris versicolor* has now been naturalised for several years in the reedy swamp at Ullswater, as well as the River Calder in Yorkshire and by Loch Tay.

The successful rearing for over a year of four hybrids to 14 in. length and over 1 lb weight after fertilising 100 rainbow trout eggs with Atlantic salmon-milt, at the Gwynedd River Authority's North Wales hatchery, is very interesting. An earlier experiment to fertilise 45,000 salmon eggs with a male rainbow trout failed. A further attempt to fertilise 6,000 rainbow trout-eggs with salmon-milt left nearly 50 per cent unfertilised. The hybrids inherit the rainbow's quicker growth than salmon. What are called rainbows in Britain are the spring-spawning American steelhead trout, *Salmo gairdnerii*, whereas the trout called rainbow in North America is a different species, *S. shasta*. It's about time ichthy-

ologists adopted a standardisation of Anglo-American nomenclature, as ornithologists did years ago.

Rainbow trout-eggs have previously been fertilised with brown trout and cutthroat trout-milt (*S. clarki*), brown trout-milt, and salmon grilse-eggs with sea-trout milt. Russian biologists have crossed chum and pink salmon of the Pacific species.

Plans to build 700 more houses on the south Lancashire dunes at Hightown, extending Blundell Avenue to the site of the former fort, and curving it round the Alt estuary dunes to cross the railway, will, in the next few years, obliterate the southern-most part of the famous Lancashire dune system rich in flora and fauna, with the exception of the adjoining West Lancashire golf course, which has little of its rich fauna and flora. It is the southernmost site of odd pairs of breeding sand-lizards and of several natterjack toads, and has a prolific flora of local wintergreen, *Pyrola rotundifolia maritima*, marsh and dune helleborine orchids, some grass-of-parnassus (*condensata*), bee and march-orchids, maretail, etc., for it has several damp hollows of *Salix repens*.

This comes at a time when the position of breeding sand-lizards is fairly good in Hampshire haunts, but not so good in Dorset where the activities of the English China Clay Company around the Isle of Purbeck having given rise to anxiety, and better reptile site nature reserves in chalk grassland are desired. The Dorset County Magazine drew attention to this in 1971. In south Lancashire, unfortunately, there is no unity or co-ordination among conservationists, and the county naturalists' trust is not fully representative; even its south-western regional committee, whose members are mostly co-opted, not elected democratically, has not even invited a representative from its largest subscribing society which helped form the trust! This lack of a united front lost a vital part of Ainsdale natterjack and lizard dunes to a holiday camp and building site a few years ago.

South Lancashire botanists have made no effort to save its best aquatic plant haunt—once extensive, Rufford railway trenches, a haunt of bladderwort and other species—from being filled in by a rubbish tip which has now filled more than half this two miles plant haunt with levelled rubbish. The nearby arm of the Leeds and Liverpool canal, once with two miles of yellow water lily and margined by arrowhead and other county rarities, was cleaned out by the river board without a protest. Now it has almost bare banks where once lay our major haunt of waterside pool plants.

The other year, a well-known London naturalist on a committee with me asked me to supply full notes on the fauna and flora of north-western canals for British Waterways Board's publication "Nicholson's Guide to the Waterways." This I did in much detail, and voluntarily, though I could hardly spare the time. I recently received the 176-page Northwest (2nd) part of this publication which maps all the canals from Lancashire to Shropshire and North Wales, only after complaining that the promised copy hadn't arrived. I then found I had wasted my time, for the three-page natural history section had nothing but somebody's elementary generalisations about birds and plants which any child could have surmised from the simplest waterlife-guide. Practically all this *trivia* applied to waters in general, not just the Northwest. There was no indication of the famous exotic plants and fishes established in south Lancashire canals, or the specially interesting flora and fishes of canals in Shropshire. I had completely wasted my time. Such remarks as "Near the Llangollen Canal red squirrels and adders are occasionally found" is quite out of place in such a boating publication, for one would have to motor, not boat, a few miles up on to special moors to find adders, and to special woods not beside the water to see red squirrels. Much more

interesting, the American freshwater shrimp spreading through the canals here isn't even mentioned. The boater interested in waterlife will find this chapter of no assistance as a guide to cruising through the Northwest, though a more useful fishing chapter precedes it.

Mr. Lewis Braithwaite, M.A., staff tutor at Birmingham University, tells me he is writing a book on "The Use of Urban Canals," and sent, for comment, a copy of its remarks on nature conservation. He finds no nature reserves in the Lancashire canals and seeks survey material of fauna and flora in them, adding: "I do not want people to assume that only canals in the country are of interest." Certainly not. Those around Oldham, Rochdale, Middleton and St. Helens in south Lancashire are particularly rich in acclimatised exotics, while Manchester Corporation has planted-up a classic linear park from the old derelict dirty canal through the city at Platt Fields, like Birmingham's Brindley Walk Canalside Scheme. The chief gap, as I see it, is drawing attention to the need for overall conservation of a canal, as at Aldershot, for its total waterlife, such as pool-plants and live food that can be used with discretion by tropical and cold water aquarists. Too often these things are looked at from the point of view of school teaching only.

Plants in the Marine Aquarium (continued from page 7)

- being smothered by simple algal forms, and this amount unfortunately, can only be found out by trial and error. It should be understood that the "roots" of complex *algae* are unimportant in nutrition and serve mainly as hold-fasts; therefore, it is not necessary to worry about planting mediums, as in freshwater aquariums. Nutrients are absorbed directly from the water over the whole plant surface.
3. Angiosperms: These are the so-called higher plants and most freshwater aquarium plants fit into this grouping, though the opposite is true for marine plants. The only commonly imported genus is *Zosteria*, which occurs in beds in shallow water, between the reef and the shore, and appears to do moderately well in established aquaria.
 4. Coralline *algae*: These *algae* differ from the others in that their tissues are calcified, making them hard, and they constitute some of what is commercially referred to as live rock. Members of the genera *Lithothamnion* and *Hydrothamnion* are commonly imported, and are normally shades of pink, red and mauve. They are relatively hardy and are especially interesting in that their crevices house many other forms

- of life, thus they are of great value when setting up a natural method aquarium. Coralline *algae* are very important in building of coral reefs.
5. Symbiotic *algae*: This category includes *algae* which live within the tissues of various animal species, to the mutual benefit of animal and *algae*. The *algae* found in coral tissue and in the mantles of certain molluscs are of greater relevance to the aquarist. One of the reasons why many of the reef-building corals have not been successfully maintained in aquaria is that the quantity and quality of light has been incorrect, meaning that the symbiotic *algae* have not been able to perform their proper functions. The great importance of these *algae* is shown by the distribution of reef corals, which generally are not found deeper than 50m. due to poor lighting. It has been calculated that the giant clam, *Tridacna*, lives solely on the *algae* that it forms in its mantle.

Many authorities consider that the most successful method of marine fishkeeping is the "natural" one, since this is closest to conditions in the wild. A crucial part of such a system is the algal life, which to a certain extent, stabilises the water and provides a heating environment for both fish and invertebrates.



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

Are blind cave fish found in any other countries besides Mexico?

At least one blind fish (*Caecobarbus geertsi*) known to tropical aquarium keepers is native to West Africa. Yet another species (the scientific name escapes me) is found in Cuba. But most fishes with rudimentary eyes, or no eyes at all, are found in the underground lakes and rivers common in some of the south-eastern states of North America.

Could I introduce a pair of *Heterandria formosa* into my community tank?

You could do it, but I wouldn't recommend it. The diminutive *H. formosa* calls for a tank to itself. It is far too small to be kept with the general run of community fish. A tank of about a foot square will support quite a large population of this fascinating little Floridan livebearer.

Is it true that the upside-down catfish was known to the ancient Egyptians?

Cats and catfish were depicted by Egyptian artists of the pre-Christian era. It is said that paintings of species of *Synodontis* catfish, many of which swim belly-side up in order to obtain insects from the surface, occur in architectural remains in the Nile Valley.

Could you please inform me on the size of tank, temperature, and other essential requirements of *Julidochromis ornatus*?

This cichlid from Lake Tanganyika needs a spacious aquarium because the males like to lord it over their chosen territory and can be very aggressive in defending it against all-comers. Furthermore, the water in which this species is kept must be very hard and alkaline and maintained at a temperature in the middle to upper seventies (°F). Worms such as tubificids, enchytraeids,

and the ordinary red garden worm, whole or chopped to a swallowable size, and live *Daphnia*, make an acceptable diet.

I have been told that a brilliantly marked cichlid is found in the United States of America. Will you please tell me the name of this fish and which part of America it is found?

The cichlid in question is *Herichthys cyanoguttata* or, if you prefer the older but resuscitated scientific name, *Cichlasoma cyanoguttata*, that ranges in the natural state from north-eastern Mexico and through the Rio Grande and its tributaries into Texas, U.S.A.

What greenfood can I cultivate to feed to my large Malayan angel fish and scats?

If you mean what are the fastest growing water plants to provide prunings, then I suggest that you set aside a well-lighted receptacle for the propagation of *Elodea densa*, nitella and duckweed. But you would need a large tank to provide enough prunings to satisfy a few large Malayan angel fish. I suggest that you supplement a diet of natural food with such table greens and saladings as cooked spinach, turnip tops, Brussels sprouts, bruised lettuce and the like.

Is the chocolate cichlid just another name for the oscar?

The oscar, also called the peacock-eye cichlid, the marbled cichlid, the velvet cichlid and, less commonly, the chocolate cichlid, is the species known to science as *Astronotus ocellatus*, the fish marked with stars, as the late William T. Innes put it. The fish better known to aquarists as the chocolate cichlid is *Cichlasoma coryphaenoides*, a bad-tempered fish that attains a length of some seven or eight inches. It was kept by German aquarists before World War I, and lives in the natural state in eastern Brazil.

Does the black neon tetra make a worthwhile addition to a community tank?

Hyphessobrycon herbertaxelrodi, named after the great American publisher and aquarist, is a peaceable tetra ideally suited to sharing quarters with other similar sized fishes.

Have species of *Selenotoca* ever been imported into this country?

The short answer to this question is yes, but very infrequently indeed. I once saw some beautiful specimens, with broad black vertical bands on satiny white sides, swimming in a huge tank in a now defunct Holborn, London, department store. But this as long ago as the late 1930s.

Is it true that it is not possible to breed the giant sailfin molly in the home aquarium?

The giant sailfin molly will breed in the home aquarium but the problem is to raise youngsters that look as handsome as the parent fish. You see, the giant sailfin demands a really spacious aquarium, with water hard and slightly saline, a good toplight, and a diet rich in algae and natural livefood such as insect larvae and *Daphnia*. These and other factors are necessary for the production of good body size coloration and finnage.

I should like to know something about the pretty pike head?

The pretty pike head (*Luciocephalus pulcher*) has ugly habits. Smaller fishes and other creatures vanish when it is around faster than ice-llollies at a school outing. Its popular appellation is a misnomer because it is not particularly pretty. It looks like a stretched pike, with a dark horizontal stripe bordered above and below with white. The upper part of the body is speckled with red. Malayasia and Indonesia is its home and it grows to about six inches. It is closely related to the gouramis and paradise fishes and like them can breathe air taken at the surface. It is not one of the easiest fishes to keep because its proper care

calls for well-aerated moving water stocked with thickets of shelter-affording vegetation.

I have just bought two small tropicals called blue perch. I cannot find this fish described under this name in any of my aquarium books. I would be grateful for any information you can give me about it.

The blue perch, alias Buchanan's pygmy perch, will be found in the more comprehensive books under the scientific name of *Badis badis*. It is native to India and Burma. Ordinarily it attains a length of three and a half inches. It can be as erratic in temper as an aged general excessively filled with strong spirits and gout, and changes its colours frequently. It needs live food, a temperature in the middle to upper seventies (°F) and some non-iodised salt in the water.

Why do some cichlids store their deposited eggs inside the mouth of one of the parents and permit them to stay there unharmed during the entire period of incubation?

We can only assume that certain species have learnt through the evolutionary process that eggs stored inside the mouth are kept clean and better aerated than those scattered or stuck down among stones or plants. Then again, newly hatched fry hidden from view inside the parental mouth stands a better chance of making their way in the underwater world (later on) than those unfortunate youngsters left exposed to attack by a variety of keen and ever-watchful predators.

I have been told that the lattice cichlid does not grow larger than three inches and behaves itself in a community tank. Please give me the scientific name of this cichlid, its country of origin, and whether it is likely to be found in the larger dealers' stock tanks.

The lattice cichlid is known to science as *Nannacara taenia*. It has been in circuitous circulation for some sixty years yet still remains an elusive species. It hails from the Amazon.

COLDWATER QUERIES

I have a small out-door pond into which I introduced some fresh water mussels. I have some Sticklebacks in the pool which are now showing white spots on their bodies. These spots are larger than those seen on tropical fish and appear to have a definite round shape and protrude from the body. What do you think is the cause?

I suspect that the mussels are responsible for the objects sticking to your fish. It is a great mistake to introduce fresh water mussels into a garden pond.

by Arthur Boarder

I have often stressed the dangers of this, as mostly there is insufficient mulm in the bottom of the pond in which the mussels can move about and feed. These mussels produce large numbers of eggs which are passed into a form of brood pouch. They are fertilised there but retained for some considerable time. Usually in the following spring the larvae, called, *glochidium*, are ejected into the water when they fall onto plants or the bottom. They are almost like a small bivalve but have a protruding thread which enables them to stick to plants. Later they must become attached to a fish

for their further development and this is what has happened in your pond.

The tiny creature will stick to a fish getting its nourishment from the fish for about three or four months when it will drop to the bottom and live as an adult mussel. It is well known that the Three-spined Stickleback is very prone to become the host for the larvae and so there appears no doubt that the objects on yours are the larvae of the mussel.

I have a tank with goldfish and a few plants. The plants get a covering of brown filth on them and the water is not clear. What is the reason?

I suspect that you are feeding too much. Try cutting down on the dried food for a week. You may think that the fish will starve during this time, but do not worry about this. Fish can go for long periods without being artificially fed. I recently found a fantail goldfish in an outdoor tank which had not been fed by me for at least nine months. The tank is a 60 gallon cistern which is sunk into the ground and is covered with opaque glass. I thought I had caught all the fish from this tank last autumn, but it is almost impossible to net all the fish from such a tank if the water is on the green side. I should have emptied the tank completely, which is the only sure way of clearing such a tank. The fish in question had grown larger than other fish of the same spawning, although they had been fed regularly by me. Of course the tank was well planted with Hornwort and no doubt the fish lived on vegetation and any insect larvae in the tank. As the fish had plenty of swimming space it had thrived very well, and so to leave your fish for a few days will not only do them good but will probably tend to clear the matter from the plants.

I wish to construct a garden pond with a liner. Can you tell me where I can buy one? Also how deep should I make the pond for it to be safe from freezing too badly?

I am enclosing an address from which you can get a liner. You should make the pond at least two feet deep. This will ensure that it is very unlikely to freeze up deep enough to harm your fish. On the other hand I do not recommend that a pond should be made too deep. If so, much of the water near the bottom can become very unhealthy and lack oxygen. I would never make a pond deeper than two and a half feet deep, as I am sure that the more shallow the water, the more oxygen it is likely to hold, as a greater proportion is in contact with the air and so gets well oxygenated. The trouble with a very shallow pond is that in very severe weather it could be covered with a thick layer of ice and become dangerous to the fishes.

Some of my goldfish have bred in the pond and I have caught some and have them in a tank. Several of these have died. When do I start feeding them, they are half an inch long?

You should have fed the youngsters before they are as large as they are now, and it is no wonder that some have died. After the initial feeding with Liquifry, they should be given dust-like dried food or sifted Daphnia, if you can get them. A very good food for the fry is flake food which has been reduced to a powder. This can be done by rolling it with a bottle or similar object. Then sift it through something fine, such as a stretched silk stocking. That which does not pass through can be rolled out again. After the fish have grown a little the ground food can be sifted through a fairly fine tea strainer. Then mashed white worm, or garden worms can be given. See that you are not overcrowding the tank and you should be able to rear the fish. Don't forget to change some of the water for fresh once a week.

I have a garden pond, 12 ft. by 8 ft., and would like to know how many fish it will hold?

This is a query I am often asked either by pond-keepers or aquarists. I do not like this question at all, as it implies that the pond has to be crammed with fish. I would rather have the question, "How many fish should I put in?" A flower-vase could have fifty flowers stuffed in it, when it would look terrible. But the same vase with eight to 10 flowers could win a prize in a floral art class, if suitably arranged. I would far sooner see a pond which has to be examined for a few moments to try to find the fish, than to be faced with a pond where one could hardly see any water without fish. I like to look for the fish and I am sure that no dedicated aquarist or angler can cross a bridge over a small river or stream without looking over the side to see if any fish is in sight. Then the appearance of one small trout can give quite a thrill.

I suspect that this craze of new fishkeepers to cram their pond with as many fish as possible arises from the old image of the fishmonger's tank on top of the marble slab; this had a hose running in fresh water all the time which, incidentally, allowed the overflow to run out over the fillets of cod and plaice. Such tanks were usually teeming with goldfish so that the poor devils could hardly swim without touching another fish.

Try to keep your pond as an attractive feature of the garden with suitable plants and only enough fishes to allow them to thrive and look in keeping with the amount of water. I suggest that ten 5 in. fish would be enough for the pond in question and then they could live healthily and probably breed.

At what age do Koi breed, please?

If the fish have been bred under good conditions they should have grown large enough to breed by three years of age. They would, of course, have had to be fed well, with plenty of swimming space. These fish grow quickly if well looked after and one of six inches overall could breed.

Do Koi and Orfe inter-breed?

As the fish are of different species it is practically impossible for them to inter-breed. Having said that, I am, I suppose, leaving myself open to future criticism, as one day the unusual happening could occur. However, I think I shall be perfectly safe in stating that your fish are not likely to do so.

When eggs have been laid in a pond is it a fact that they must be removed to another pond or tank in which to hatch?

They do not *have* to be removed from the pond, but if not it is probable that most, if not all, will be eaten by the parent fish. The only chance of any subsequent fry surviving is when there are so many fine-leaved water plants present that it is very difficult for the fish to swim among them to eat eggs or fry.

Are the eggs attached to pond weed singly or in clusters?

The eggs of Koi and goldfish are laid singly but in large numbers. They attach themselves to whatever they come in contact with, water plants or the sides of the pond. It is a very remarkable feature of these eggs that they are capable of holding their adhesive substance under water. One would think that once in the water the eggs would lose this stickiness.

We seem unable to keep goldfish healthy for long in our tank. It has gravel and artificial plants in it and we do not over-feed. Why cannot we succeed?

You may be over-stocking with fish, as this is where most beginners go wrong. It is far easier to keep a few fish healthy in a tank than to try to have too many. I do not like the use of artificial plants in a cold water tank. Apart from the fact that there may be something in their construction which could pollute the water, it is a fact that they cannot do any good. Growing water plants have several advantages over the others. In the first place the artificial ones may look something like real ones at first, but one would get tired of seeing the same shape all the time, whereas real ones would give a varied shape as they grew. They use up much of the

waste matter from the fishes and so tend to keep the water purer. They also give off oxygen during the hours of daylight to the benefit of the fishes. When one is away on holiday the fishes could get some nourishment from them, and so their advantages are obvious.

How long can goldfish live and how long could they survive out of water. I found a goldfish on the floor of my room behind the gas stove after it had been missing from its tank for six-and-a-half hours. I put it back in its bowl and it soon began to swim around. However, four days later it died. Why did it die after appearing to recover when put back into the water?

Goldfish can live for more than twenty years. As for how long they live when out of the water, this does depend on the circumstances. In your case it was rather a long time for the fish to live, but the reason could have been that it was lying in the shade and away from sunlight. The time a goldfish can live out of water is related to the time its gills take to dry. Once this happens the fish would die. I have had several experiences of finding a goldfish out of the water and when returned to water it has recovered. Your fish may have died subsequently as it could have received some injury when it fell on the floor or as it thrashed about. Providing a fish receives no injury when out of the water it could live for quite a long time, providing its gills keep wet.

Please could you give me any information about the Axolotyl?

The Axolotyl is the larval form of the Salamander (*Amblystoma*). These creatures are usually black, almost like a large newt with extending branching gills. They lay eggs freely even in captivity. They were long supposed to be adult animals of the newt tribe, but it is now known that if they are deprived of water they lose their gills and change into the typical salamanders. This is simply a case of premature sexual development. The creatures should be kept in warm water and fed on live foods such as garden and white worms or *Tubifex*.



Axolotyls.



Film Shows Wanted

As a newly formed body the Abingdon District A.S. is finding it rather difficult to get hold of good quality slide shows and tapes.

I would be very grateful if society secretaries, or anyone else, having such items for hire could contact me at my home address.

G. R. HALL, Secretary,
Abingdon D.A.S.,
24 Lower Radley Park,
Abingdon, Berks.

I would appreciate, if any of your readers would put me in touch with Companies and Organisations who would lend or hire films, etc. to this society.

J. P. NAISMITH,
Kilgobbin,
Sandyford, Co. Dublin,
Ireland.

Unavailable Remedies

Your correspondent Mr. MacVey rightly draws attention to the difficulty of obtaining quite common remedies from chemists (February, 1973).

I wonder if the greater profit and less trouble obtaining from the sale of branded medicines has anything to do with our problem?

It may also be remarked that of the numerous fish tonics and medicines available the only manufacturers that I can find who are prepared to tell us what we are buying seem to be foreign, possibly because of stricter laws in Europe than here.

I suggest that our people put their houses in order. If they don't they are liable to lose business. I, for one, would like to know what I am buying.

S. A. HULFORD,
Eastfield,
Reeth, Richmond,
Yorks.

Discus and the Experts

With reference to the articles in previous issues of the *Aquarist*, regarding the "Keeping of Discus". I, like any other person who keeps these fish, read all that is published, and apply some of the points to suit my own conditions, or the conditions I eventually hope to simulate in my tank set-up. For

instance, I hope to create as true a picture of an Amazon river bank eventually, but never having been to the location, I have to rely on the experts to furnish the information I require.

As for keeping Discus, several years ago I lost many fish and a lot of money and almost gave up, but I was put in touch with an expert, Dr. G. Schubert, who although a very busy man, supplied me with enough information (four typewritten sheets) to enable me to keep the better sub-species, blues, greens and even turquoise without any trouble—so I say to your correspondent from Exeter, "Should I have disregarded this *Expert* or any other for that matter?"

As for his size of tank, it seems to be rather small for the number of fish he mentioned he had, but perhaps they are not grown to full size yet. I was a bit alarmed when he stated his colour changes—black? Surely a sign of wrong conditions.

Also, when your Discus die, I suspect gill parasites, not water conditions, reference my *Expert*, salt solution cures this complaint.

I am a member of the Torbay Aquarist Society, and I feel sure that we would be most interested to hear this gentleman's simplified way of keeping Discus—I'm sure we could find a spare evening for him!

M. MATTHEWS,
13 Langridge Road,
Paignton,
Torbay TQ3 3PT.

Successful Spawning

As a keen aquarist specialising mainly in Cichlids, and as a reader of *The Aquarist*, I thought you would like to know of my success in breeding *Pelmatochromis thomasi*. This pair of fish would regularly spawn in my community tank, tending and protecting the eggs for about two days, when they would eventually eat them. So I decided I would remove the eggs, on the next occasion, for artificial spawning. This I did and the chosen area was a piece of slate. Having prepared my tank ready for the eggs, I added Methylene Blue and put an air stone just near the eggs with a gentle air stream. The date was 30th October, 1972, and they hatched on 1st November, 1972. They were free-swimming on the 5th November and the first food they had was liquid fry, which I fed for three days. I then followed on with a well-known brine shrimp, and kept them on this for three weeks to a month, gradually moving them on to chopped *tubifex*, *daphnia*, etc. I then transferred them to a larger tank where they progressed satisfactorily. At this stage I estimated about 70 to 80 fish. But what a surprise I had in store! When the fish were three months old I decided to take an accurate count and was amazed at reaching the figure of 156! This was just one spawning. I had artificially bred *Kribensis* the same way but only got a

figure of 60 young which was quite pleasing.

The fish have since spawned and I now have another batch of young of an unknown quantity. It will be very interesting to know how many materialise. I hope this information is of interest to you and all your readers.

ALAN JOHN EVANS,
24 Gilbert Close,
Alway Estate,
Newport, Mon. NPT 9NW.

Goldfish Standards

I would like to reply to a reader's letter, also Mr. Boarder's reply, and to an article considering goldfish standards. First, I would like to reply to Stephen Papista; he is of the opinion that Mr. Boarder is the only one who disagrees with the G.S.G.B., and that the majority of people who breed and show fancy goldfish are members of the G.S.G.B. It is a known fact that there are just as many people breeding and showing fancy goldfish as there are members of the G.S.G.B., so how can the Standard Committee formulate standards, in his own words, for the vast majority of people.

I would now like to raise a few points on Mr. Boarder's reply to Mr. Papista's letter. Though I am a great admirer of Belle Vue Show, and have many friends in that area, I would not regard it as a top fancy goldfish show. If he still yearns to see the fish in quality and quantity that he saw years ago, why not this coming year visit the M.A.P.S. show at Bingley Hall, Birmingham, and the Bristol Aquarist Show at Bishopston Church Hall in September. In both shows there are 19 classes for fancy goldfish, consisting of Breeder Teams, Matched Pairs and Single Entries. On behalf of the M.A.P.S. show committee I would like to invite Mr. Boarder along to the show in August and he might write an article on the show, which would make interesting reading.

I don't think Mr. Cluse, in his article "Considering Goldfish Standards," answered any of the justified criticism made by Mr. Boarder in his review of G.S.G.B. show standards. I was at all the meetings which took place between the G.S.G.B., Bristol Aquarist Society and the M.A.P.S. to try and formulate new goldfish standards, and to say unsuccessful attempts were made to discuss standards, means that he was either not at the meeting or was misinformed afterwards. The G.S.G.B. recognise three colours of the spectrum: orange, yellow and black; red is also a colour of the spectrum, and when it suits the G.S.G.B., they also use the term "red" as in the show catalogue in the F.B.A.S. Show in London in October. Mr. Affleck, in an article many years ago, also used the term "red." I would be quite satisfied with the offer to pluck a scale from the reddest fish and to send it to the British Colour Council for identification, if he

uses the same exacting means in naming some of the goldfish:

Bramblehead: Bramble (Oxford Dictionary)—Black-berry or any thorny shrub. Does this description describe a growth on a lion head? I think not.

Globe Eye: Globe (Oxford Dictionary)—Ball or sphere, a round or spherical body. If this describes a fish with protruding eyes from the head, again I think not.

I was interested in his comments on the Fantail Moor and the Nymph as being throw-outs from other spawnings. While I am in agreement with Mr. Cluse on these two fish, the same could be said of the Nacreous Fantail and of the Matt Fantail; these two fish can come from nacreous veiltail spawnings. A number of years ago, at the G.S.G.B. Show in Sutton in Surrey, a fish which won the highest pointed fish in the show trophy was a Nacreous Fantail which was a throw-out from a Veiltail spawning. The point I am trying to make is that you should cater for all secondary fish or none at all and not follow your present method of discriminating between some. The last point I would like to raise with Mr. Cluse would be on the Oranda. In a recent article on the fish he ended by saying they didn't consider altering the fish as it was hard enough to breed as it was with the forked tail. About eight years ago, around Birmingham, was a strain of Scaled Orandas with good head growth and a broad tail. I am pleased to say these fish are reappearing around Birmingham again. How can you expect people to adopt your inferior standard which only looks like a Japanese import? I would like to see the day when everyone who kept fancy goldfish joined the G.S.G.B., but on these standards I cannot see it ever happening.

A. E. ROBERTS,
M.A.P.S., Birmingham,
596 Queslett Road,
Pheasy Est,
Gt. Barr, Birmingham.

Tasty Tadpoles

In his article on the common frog, Andrew Allen states that "they and their tadpoles will coexist with goldfish and most other fish—except sticklebacks, perch and pike." I must warn readers that frog tadpoles will not live for long in a pond containing goldfish, as well as most coarse fish. From the time tadpoles of frogs are free-swimming they are eaten voraciously by goldfish and it is only when they are practically fully grown that they swim so fast that they could escape from them. Toad tadpoles when about half-grown will not be eaten by goldfish.

A. BOARDER,
Ruislip.

Continued on page 35

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

by *Andrew Allen*

22. The Moor Frog (*Rana a. arvalis*)

Description.—This is rather a slender frog growing to a maximum length of 8 cms., with long hind legs. The back is usually smooth, but there may be a row of tiny warts down each side. The male has internal vocal sacs, and dark, horny nuptial pads on the first finger of each hand during the breeding season. Dorsal coloration is almost always brown, sometimes plain, sometimes with darker spots. There is always a large, dark patch in the region of the tympanum, and sometimes a pale line bordered in black down the back. In the breeding season the male may assume quite a vivid blue colour, thanks to the lymph stored beneath the skin. The ventral surface may be an unspotted white, yellow or cream.

Distribution.—The Moor frog is essentially an inhabitant of North and Central Europe. This includes North-East France, Belgium, Holland, Denmark, Sweden, Germany, Austria, Hungary, Yugoslavia and across Russia to Siberia. In the North it reaches to the Arctic Circle, in the South to Burgenland. Throughout this wide range it is a lowland animal, favouring marshes, heaths, meadows and forests.

Breeding Habits.—These are very similar to those of the Common frog. Mating commences in late March, the call of the male being dull, low in pitch, and repetitive. The spawn is usually laid in a single mass containing about two thousand eggs, or more rarely in two separate clumps.

Care in Captivity.—During the past few paragraphs

the similarities between this frog and *Rana temporaria* will have become obvious. It would be naive to say that it required identical treatment, but generally speaking it will do well in much the same conditions. Thus it does not make a good inmate of the indoor vivarium, sharing this characteristic with all the other members of the Ranidae. If it is kept indoors it will require a large pool and a fairly, but not excessively, humid atmosphere. Shelters should be provided, but plant life should be restricted, giving a reasonable amount of open jumping room.

As the notes on its distribution have illustrated, this is a thoroughly hardy species that is well at home in Northern climes. Hence it will settle down perfectly in the outdoor reptiliary, and survive our winters with ease. All it needs is a varied habitat suitable for the other fully hardy frogs and toads, namely a large pond with marshy surround, open grassland, mixed, shady vegetation and numerous rocky shelters. It may hibernate on land or in the water, so the pool should be provided with a good depth of muddy substratum. This won't help visibility, but it will be welcomed by the frogs themselves. An equivalent arrangement in either greenhouse or cold-frame will suffice very nicely, though neither of these forms of accommodation provides any improvement upon a well designed reptiliary. This is not a species that appreciates the heat, so it derives no advantage from the unique qualities of the greenhouse. If it is housed under these conditions it is imperative to provide large areas of deep shade.

The Moor frog will take exactly the same range of foodstuffs as the Common frog, and will fit nicely into the same communities. From the latter point of view it can be regarded as interchangeable with *Rana temporaria*.

Though similar in many respects to the Common frog, this is an interesting and distinct species. It is well worth a place in the vivarium, particularly in the balanced outdoor community.

R. a. issaltschikova comes from Northern Russia.

R. a. wolterstorffi is found in Hungary, Romania, South Poland and Yugoslavia. It is slightly larger than the type, slender, with longer legs, and superficially it resembles the Agile frog in many respects. Its general treatment should be the same as for *R. a. arvalis*, but it should be allowed even more space in the indoor vivarium, to accommodate the greater length of its leaps.

23. The Agile Frog (*Rana dalmatina*).

Description.—Male specimens may grow to about 6 cms. in length, while females may sometimes attain 9 cms. The body is distinctly slender, the legs are enormously long, ensuring that there are no problems concerning identification. The tympanum is very noticeable. The male has no vocal sacs, but does have a grey (not black) nuptial pad on the first finger of each hand in season. Dorsal coloration is a uniform light brown, rarely with darker brown or black markings. There is always a dark patch around the tympanum. Ventrally it is yellow, white or cream in colour, only seldom with other markings.

Distribution.—Essentially this species has a wide, rather non-uniform distribution in Central and Southern Europe, extending as far as Sweden in the North. This includes North-West Spain, France, Germany, the Balkans, the Caucasus and Asia Minor. It favours areas of low or medium altitude, particularly mixed woodlands, and has often been recorded from Beech forests. It may be found quite a large distance from open water, but always in damp locations.

Breeding Habits.—The season starts in late March, the male uttering a loud croak despite his lack of vocal sacs. Spawn is laid in clumps in small ponds, ditches and watery hollows, often in shady, wooded areas.

Care in Captivity.—Many of the comments made about Common and Moor frogs apply equally to *Rana dalmatina*. However, the implications of its name should be taken carefully into account. It is a terrific leaper capable of covering six feet in a single jump and coupling this with heights of about two feet.

Clearly this just about disbars it as an inhabitant

of the indoor vivarium. It is extremely nervous of temperament and takes flight readily. In confined conditions it is almost certain to damage itself against the walls of its vivarium, and such injuries usually lead to disease and ultimate death. For this frog a vivarium of six feet by six feet would be distinctly cramped, and a smaller size would be well nigh useless.

Better by far to give it the run of a spacious outdoor reptiliary, where its leaps are unlikely to end in disaster. But please ensure in this case that the walls are sufficiently high to contain it, for under the stimulus of panic it is capable of great feats. Such a reptiliary should be provided with a generous amount of shady plant life, preferably in the form of a corner entirely devoted to small shrubs. In essence this is a frog of the forest floor, and if we cannot provide a fully fledged forest within the vivarium, we can at least do our best to substitute a reasonable imitation version. Perhaps this can be carried out more easily in greenhouse or cold-frame than in a reptiliary, where there must of necessity be strict control of the height of all plants. Ideally a greenhouse or cold-frame designed for this species should be placed away from the sun, and filled with tall bushes or small trees. There should be a pool, perhaps half-choked with decaying leaves, and a good variety of shelters. This arrangement would suit most newts, salamanders and toads, as well as the agile frog itself. Though these are perfect conditions for this one animal, it will adapt itself quite readily to a less specific habitat in a community vivarium designed for a wider range of inhabitants.

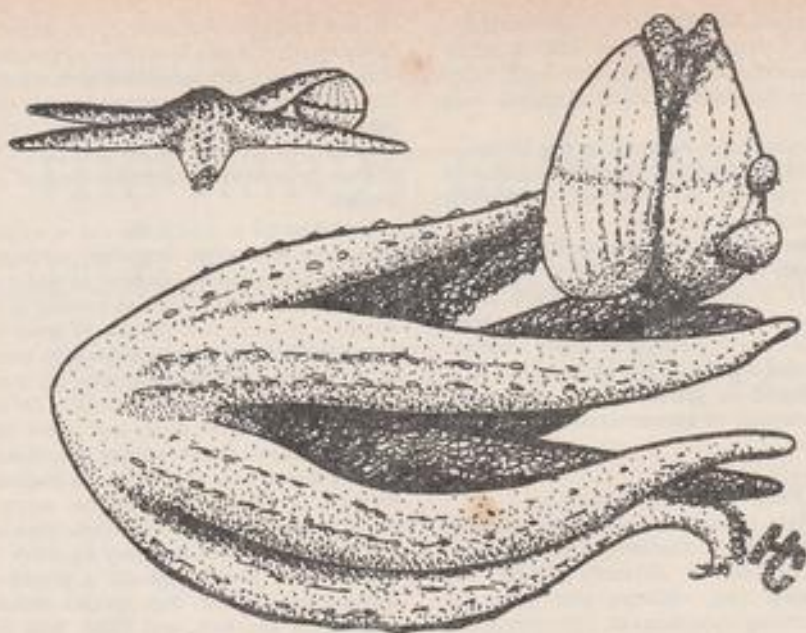
Its diet need cause no problems, for it will take the same range of terrestrial invertebrates as the other medium-sized frogs and toads. It will also fit easily into most communities of the smaller reptiles and amphibians, provided that enough shade and space are available.

This is a beautiful, fickle and unusual frog, highly demanding but also highly rewarding. It is not an easy species to keep successfully, especially for those rash enough to house it indoors, but its interesting habits and unfamiliar nature constitute a tempting challenge.

There are no sub-species.

For the sake of completeness it is necessary to mention *Rana macrocnemis*, a small, plump, brown frog from Asia Minor and the Caucasus. I have never seen a specimen nor noticed one offered for sale, and can offer no comments on its care. It is quite closely related to the Moor frog, and would probably require fairly similar attention.

This concludes our survey of the Order Anura, the tail-less Amphibians of Europe. In the following article we will consider the Grass, Dice and Viperine snakes.



STARFISH:

Scavenger & Destroyer

by Huw Collingbourne

THE STARFISH, *Linckia*, tears itself apart to reproduce! And a fragment of flesh only a few centimetres long can develop into a complete new animal. Even Britain's most common starfish (*Asterias rubens*) has remarkable regenerative powers and even if all five arms are broken off, it is still possible for it to grow a new set of limbs. Occasionally, however, an arm is only slightly damaged at its base, causing a new arm to form without the original limb dying. This can result in six or more legged animals.

The usual number of legs for an undamaged starfish varies dramatically from species to species. The lowest known number is four and the highest is fifty. Our native sunstar has up to fourteen limbs.

And while on the subject of limbs, it may be worthwhile to mention the basket star. This creature is an echinoderm, closely related to starfish and brittle stars. It has five arms, but these are not just straight locomotive limbs as you might expect. Each arm branches at its base and each branch divides again and again. One or two arms cling to a base of rock or coral, while

all the others curl upwards and inwards to form a mesh like an openwork basket. Then, when a prawn or a shrimp comes swimming nonchalantly by and accidentally touches one of the arms or its countless ramifications, it will be immediately siezed by all the other arms which wrap themselves around the animal. In this way the arms react rather like the tentacles of a sea anemone.

When dead, the arms curl up tightly like a ball of snakes or, conceivably, a head of snakes, which gives rise to the basket star's other popular name of gorgon-headed starfish.

The basket star is about 60 cms. across which, you might think, is pretty big for a starfish. In fact, the world's largest starfish is almost a metre in diameter! At the other end of the scale, the smallest of the ocean's stars is a little over 1 cm. across. *Asterias rubens*, the common British starfish sometimes exceeds 40 cms.

Asterias rubens is the starfish with which most people are familiar. It has five arms and may vary in colour from the usual orange to yellow, green, brown and

even black. It has a reputation for destroying oyster beds. *Asterias rubens* feeds upon a variety of bivalve molluscs, forcing the shells open with the tremendous power of its hundreds of tiny hydraulically operated sucker feet in channels under the arms. Once a bivalve shell is open, the starfish vomits its stomach and digests the animal outside its body.

But the common starfish is not without enemies. One of its most fearsome predators is, in fact, the cannibalistic sunstar.

Among the most beautiful starfish are the very delicate brittlestars. The little burrowing brittlestar, (*Amphiura filiformis*) is a very fragile creature with fine spines along the edges of its limbs. Like the other brittle stars it is a scavenger, and this particular species is, in fact, phosphorescent.

One very unpopular starfish at the moment is

Acanthaster planci, the crown-of-thorns. Its sixteen spiny arms make it one of the most sinister looking starfish, and sinister it is. In 1963 swarms of the creatures were noticed on Australia's Great Barrier Reef, and also in the Red Sea. The crown-of-thorns eats coral polyps and in a very short time much of the coral reefs which they attacked were left bleached and lifeless. Hundreds of miles of coral have now been completely destroyed and the crown-of-thorns has become a plague to coral reefs in many parts of the world. Nobody knows exactly why the animal suddenly became the mammoth problem it is today. It is thought that pollution may have unbalanced the life in the sea and given the crown-of-thorns the chance to dominate the reefs. It is interesting to note that on the most polluted shores in Britain, starfish thrive while other animals die.

Crenicara filamentosa

by Frank Stevens

THIS LITTLE fish is rarely seen in our local aquatic stores and in fact its comparatively rare cousin, *C. maculata*, is easily available by comparison. I came across my specimens purely by chance. Last February I assisted our local importer with a shipment of fishes from Guyana which arrived at Glasgow Airport at the unearthly hour of three in the morning. On clearing the boxes with the Airport staff we raced back to the importer's premises as the fish were about 20 hours overdue and we were quite concerned about their welfare. On opening the various boxes we were happy to find that losses were surprisingly low when their late arrival and the time of year were taken into consideration. While everyone else opened boxes and floated bags, I gave my undivided attention to the dwarf cichlids in the shipment, 500 Rams, 500 *Apistogramma Ortmani*, 100 *Apistogramma pertense* and 150 *Apistogramma reitzigi*. Having placed their bags in their respective quarantine tanks, I waited until the temperatures had equalised, checked the respective pH values, and finding them reasonably similar, emptied the fish into the holding tanks.

At this point I took my leave and made for home, after promising a visit in the morning to give the

dwarfs a more detailed inspection. Having convinced my wife that my late night escapade was entirely due to tropical fish and dispelled the unwarranted suspicions that she held, I rose quite late the next day and made my way back to the importer's premises. In the full light of day I could examine the shipment properly and was able to advise my colleague that he had been only 50 per cent lucky as far as the dwarf cichlids were concerned. The Rams and the *reitzigi* were in excellent shape and condition and very few had succumbed to the rigours of their prolonged air journey. With the *pertense* and the *ortmani* he hadn't been so lucky for both these species seemed to me to be emaciated and many fish were suffering from a form of fungus which seemed to be spreading rapidly.

At the end of that day we reckoned that losses of these two species were between 60 per cent and 75 per cent, and the remainder would only pull through if the fungus could be checked. A proprietary brand of fungicide was added to the tanks, the temperature was raised by 8°F. and heavy aeration was employed in the affected tanks.

This treatment worked and within 48 hours all traces of the infection had vanished and the fish

were greedily taking the *daphnia* that had been fed to them.

It was when I netted a few out of each tank and put them into a small inspection tank that I first noticed the odd-looking specimens that were swimming in two of the five quarantine tanks. In coloration they were not like either the *perouse* or *ortmanni* having a blue tinge to the dorsal fin and a striking light stripe on the caudal fin. In size they were similar to the *perouse* but were of a more elongated form and the head tapered quite sharply to a small mouth.

In my first stab at identification I thought they might be particularly ill fed specimens of *Apistogramma trifasciatus trifasciatus* and therefore the only course of action was to feed them heavily and hope that they would regain good health.

In all I found seven specimens in the two tanks, five with the white stripe and two without. These two grew very little and eventually proved to be females, but more of that later.

All seven fish were housed in standard South American dwarf cichlid conditions. A two foot tank was used and was very heavily planted with hairgrass and *Vallisneria*. The water had a pH value of 6.6 and the temperature was maintained in the range 80-84°F. Small flowerpots with the bases knocked out were used as hiding places and the whole set up was illuminated with a 15 watt lamp which affected the plant growth somewhat but seemed to be the preferable level for the fish.

Feeding consisted of copious amounts of live foods, *daphnia*, glassworm, bloodworm and on the few occasions that I could not obtain any of these they took *tubifex* rather reluctantly. For the first few weeks all dry foods were refused completely but in the tenth week of their stay the largest fish accepted TetraMin and the others quickly followed suit.

During this time they grew quickly in length but never was there any increase in girth and this threw doubts on my first identification as *A. trifasciatus trifasciatus* is quite a robust fish and does not conform to an elongated description.

The one thing which did please me, however, was the rapidity of growth of their finnage. As you can see from the accompanying photograph the male of the species has a most beautiful tail the shape of which reminds me of the Killis. The five males had grown to a size ranging from 2 ins. for the smallest to 2½ ins. for the largest, while the females remained quite small, the largest measuring no more than 1¼ ins. The males have a velvet brown colour on the upper body and are grey with a bluish tinge on the belly. The dorsal, anal and caudal fins are speckled with irregular dots and the magnificent tail has two long filaments. He has a dark band

running along the middle of the body and this is edged on either side with yellow/white markings.

The female is similar in colour, which is unusual for South American dwarfs, but does not have the large tail and has only one line of marking running along the body.

By this time I had made another identification based on a colour plate shown in "The Encyclopedia of Tropical Fishes" (Axelrod & Vorderwinkler) of *C. filamentosa*, but was still not certain as this plate did not show the fish with extended fins. However, I was fortunate in having a German aquarist visit me in July and he was able to confirm that my fish were indeed *C. filamentosa* as he had kept them some years previously.

Breeding *C. filamentosa* was an unknown factor as I could find no reference in any of the hobby books. Again I could only find information on the Checkerboard Cichlid, *C. maculata*, but the sum total of this was that species the genus *Crenicara* are extremely reluctant to reproduce in captivity. I had watched my fish continually for signs of mating behaviour but although they displayed to each other occasionally there was no evidence of display or pairing between the sexes. The females looked to have well-filled bodies but still did not show the heavy stomach development normally associated with ripe females.

This state of celibacy continued until the third week in August when we had a terrific series of thunderstorms over central Scotland. I am not sure whether barometric pressure rises or falls under these circumstances, but whichever it was had the desired effect on the fish. While feeding in the evening I noticed that one of the males was continually driving the others from the vicinity of one of the flowerpots. I tried to examine the inside of the pot without disturbing the fish but could make out nothing other than one of the females inside.

The following morning I went into the fish room without switching on the lights and with the aid of a pencil torch was able to see both fish resting in the flowerpot and up above them on the upper curve of the pot were 15 or 20 brown eggs.

I switched on the lights and left them alone until the next feeding and on my return I noticed that both fish were well away from the flowerpot and subsequent inspection showed that the eggs had disappeared, presumably eaten. Another pair spawned the following week with the same result and up to this time five sets of eggs have been eaten. I have not yet tried artificial hatching and had intended to do so with the spawning, but unfortunately the fish have decided to have a rest or are awaiting another thunderstorm, for there have been no recent spawnings.

However, I hope this state will not prove to be permanent and that sometime in the future I will be able to raise some fry of this interesting dwarf cichlid.

DISCUS:

Further Notes to Assist the Beginner

by K. Booth

I HAVE been keeping and breeding tropical fish for about ten years and although my community tank is still interesting, the need for new fields lead me to the king of them all, Discus.

My breeding tanks (two 54 × 12 × 12 in.) are built into a cabinet, side by side, in the lounge, but they are not in an ideal position for Discus—too close to the door, and with seven-year-old twins and an alsatian, it is difficult to control slamming doors which cause my fish to jump. Next year I hope to convert the loft and move the tanks up there, funds permitting.

These notes are not going to assist the experienced Discus keeper, the object is to help the beginner with Discus. However experienced in general fish-keeping, Discus are different.

I started by reading books and articles by people like Dr. Axelrod, Mr. Skipper, Mr. Cooke, Mr. Wattley and so on, but they all differ and this fact does little to encourage the beginner.

First, I completely cleaned and re-set my tanks. I used under-gravel filters and plastic plants. The pH can easily be controlled with peat, but the hardness is a bit more difficult. I found the chapter on water in "All About Tropical Fish" by Derek McInerney and Geoffrey Gerrard very helpful on this subject.

Tapwater in my area is about 9dH (durognost) pH 7.4. Rainwater seems to have very little to offer, about one or two per cent less (dH). Buying pure water is an expensive way. When breeding Neons, etc., I bought 4 lb. of resin for £1.60, but I never had good results from putting resin in the tank filter. I used one tank to prepare the water and the other for the fish (you can use a plastic dustbin to prepare water). With the resin 1 lb. will reduce 30 galls. tapwater to 2 dH in twelve hours.

Now all I had to do was to buy my fish. I should point out that at this time I would not have known good from bad, if my life had depended on it. The price can put you right off, but don't do what I did, because cheap Discus are not always a bargain. I bought six fish of about 1 in. in length for 70p each. They were thin and nearly black. These fish were not purchased from my regular dealer and I was told "They have not been in long and Discus take a while to settle down." (I would not advise anyone to start with Discus as small as this—2 in. is as small as you will cope with successfully.) Discus should be thick across the head, not dark in colour, and certainly not black. Don't go for fish that dash into corners and hide, and above all don't buy Discus with white spots! If they are kept at the correct temperature they cannot get white spot. One other point, if you do not know the dealer, check the water he keeps his Discus in. Many dealers use tapwater. As you gain experience you will know if the fish are all right or be able to cope with trouble, but why add to your troubles at the start?

Three days after buying my fish two were dead and the other four were very dark and refused to eat (chopped earthworm or chopped *Tubifex*). They half-heartedly took some brine shrimp. The water dH 2 pH 6.4.

Returning to the dealer, I saw only about six fish. One was dead and the others looked worse than mine. When alone I helped myself to a phial of water from the tank and when this was tested it showed dH 8, pH 7. On day four: another died. There was no sign of disease, but they were not eating much. The shock of the water-change has not helped and may even have been the cause of the trouble. I decided to

remove $\frac{1}{2}$ of the water, changing the tank water to 5dH, pH 6-4. Day six: another dead.

Four weeks after my first purchase, I bought four fish about 1 $\frac{1}{2}$ in. from my regular dealer. This made six, which I thought enough in my tank.

To make it easier to follow these notes I will call the larger of the four "A" then "B", "C", "D" and the remaining two small ones "E" and "F".

When I got home, close inspection of my fish revealed:

"A" had a split dorsal and was darker than the others, but looked and acted in a healthy fashion.

"B" lighter than "A" but showed two white spots on the head and one above the right eye.

"C" as "B" but the white spots were confined to an area on the head.

"D", close inspection difficult, as this one seemed very nervous, but in the end showed a wound on the right side above the gill.

At first I thought "D" had been hurt in transit, and the spots were white spot, so up to 90° F. went the temperature.

This must have been the last straw, for "E" and "F", as the next day they were dead and the others gasping at the surface. They were moved to the second tank, but "D" was floated in a twelve-inch tank as the wound was larger and appeared to be fungused. This was bathed in a salt solution.

The next day "D" could not swim upright and the fungus was back. I now tried a mild dose of salt in the water to combat the fungus. The fish looked awful. The spots on "C" were larger, but "B" showed no change. The following day I went back to the shop only to find the remaining three were showing spots, but not as advanced as mine. This I put down to the higher temperature in my tank. I watched "D" for a long time that night and thought and thought. My only decision was, if the salt bath did no good I would have to kill it, for I could not watch it suffer any more. The next morning "D" was dead. With "B", the mark on the side had become a raw wound as it had been with "D". The spots on "C" were getting bigger and even "A" showed a white mark on the head. Still I didn't know what it was, but as a last try I got some terramycin from a local vet. and treated the tank with a small dose.

After a week, close inspection showed no sign of any spots and the wound on the side of "B" was healing up. I don't know to this day if the spots were the start of these wounds or whether two separate ailments were concerned, but I hope I never see a fish like it again. I should point out that although all the spots disappeared they all broke open first.

To try and further the experiment, I bought two of the fish the dealer still had and put them in the second tank. It seemed a good idea to call these

two "Stripe" and "Black." They have never had any trouble at all. One always shows clearly the vertical bars, while the other one goes jet black for the slightest things. This has worried me more than once, but it quickly changes back with apparently no ill effect.

My next problem seemed to follow quickly in the form of white marks on the fins (mainly caudal) of "Stripe" and "Black" with portions missing. I will not go into the way I felt at this sight, but I was advised by one of the Discus experts that this was fungus. Now consider for a moment: the tank had been under treatment with anti-biotics with the temperature up as high as 98°F. for short periods and never below 90°F. (All this information was given to the expert.) As I did not like the idea of pouring more drugs into the tank nor starting the boiling process so quickly, I removed the two fish to the other tank which was bare. After watching them carefully it became clear that "A" and "B" were inflicting the damage on the other fish as "C" was now minus the corners of the caudal and after a few days "Stripe" and "Black" showed improvement. Next "C" was placed in the tank with the two smaller fish and peace reigned for several weeks.

I continued to change the water ($\frac{1}{2}$ per week), prepared again in a plastic dustbin, then I removed the plastic plant from the first tank for cleaning and up came the filth from the U/G filter. "A" and "B" showed their dislike by going black and getting tightly into a corner. They joined the other three fish in the bare tank.

My five Discus now seem quite happy. "A" is still the "Guv" and now and then removes a piece of fin but nothing serious occurs. I am now confident that I can bring these up to maturity and, by the way, "A" or "B" stay together. (Well, I can hope can't I?)

I still regard myself as a beginner with Discus, and will continue to do so until my small fish grow and breed and I raise the fry. My only regret is that I did not follow Mr. Cooke's advice sooner, but which writer do you follow from such a large number?

To anyone wishing to keep Discus I can only advise that you first beg, borrow or steal copies of *The Aquarist* for September, 1971, November, 1971, and January, 1972. Read the articles carefully and use them as your yardstick. They have been written from experience.

Perhaps I should stay, I have never met Mr. Cooke, but would like to thank him for his articles on Discus and wish Tiny, Dozey, Jeckle, well. We owe them quite a lot.

Note.—I have not used ultra-violet sterilised water so cannot comment on this and in the filter I only use filter-wool and peat.

WHAT IS YOUR OPINION?

by B. Whiteside

Photographs by the Author



I'LL BEGIN THIS month's feature with a kick in the teeth for me, personally. It comes from Mr. K. J. Matthews, of 103 Kipling House, Stevens Road, Halesowen, Worcs. (Hope I got the address correct). Mr. Matthews writes: "I feel moved to write to you regarding what, in my humble opinion, is nothing short of a disastrous omission on your part." (It relates to November 1972 edition, page 308). "For information, 'Complete Aquarist's Guide to Fresh-water Tropical Fishes', by J. Gilbert, has itself proved to be the best seller of its type for the past 2 years, even at £4.50." (I'm sorry, Mr. Matthews; best seller or not, I have not yet read the book—possibly because I

invaluable to the aquarist with a thirst for knowledge of plants suitable for aquarium life and cultivation. Very reasonably priced at £1.50, direct, this book makes a wonderful addition to one's library." (Having published articles on aquarium plants in Britain, Germany and America—as well as drawings and photographs—I naturally know all about Mr. Roe's excellent book, and have made use of it not infrequently since I bought the book in 1964. As far as I know, that was the year in which Mr. Roe's book was first published).

In contrast, I was pleased to receive a word of praise from 15-years-old Hamish Duthie, 37 Sandy Road,



could not afford a book at this price just at the moment, having just spent over £15.00 on university text books!) Mr. Matthews continues: "Regarding Mr. H. Barham's query about the plant layout on pages 30-31, I can only suggest that he reads on into the relevant section, where he will find all of these species brilliantly illustrated and described by one of the world's leading experts on aquatic plants, Mr. C. D. Roe, of Shirley Aquatics, Shirley, Warwickshire. I would also like to suggest for reading by yourself and Mr. H. Barham the following, 'A Manual of Aquarium Plants,' by Colin D. Roe, available in two languages at least. This international reference book could easily prove to be

Aberdeen, AB2 6DS. Hamish recently wrote to me to say that he had ordered some items from a company three months ago. Having only received two letters about the items, and being a little concerned about the £2.00 which he had sent out of his pocket money, he asked if I could find out if his items would be delayed much longer. A more recent letter informs me that Hamish has received part of his order and hopes to receive the remainder as appropriate. He thanks me for having contacted the firm, resulting in speedy attention. (I'm always pleased to be able to help—if I can!).

Mr. G. Smith lives at 23 Miltonhill, Milton, Dum-

barton, Scotland, and he questions some of the figures given by Mr. J. Midgley in the February issue. He has calculated that Mr. Midgley's 40 in. x 26 in. x 18 in. tank would contain 64 gallons of water, and weigh 640 lb.—just over $\frac{1}{4}$ ton and not $\frac{1}{2}$ ton. (You may well be correct, Mr. Smith. I only select and edit the letters for W.Y.O. ?; I don't write them!).

I was pleased to hear from Dr. Neville Carrington, of Interpet, once again, as it is quite some time since he last sent us his valued opinions. Dr. Carrington still reads and enjoys this feature, and recently noted the interest in trying to evaluate output figures for aquarium pumps. He too has been trying to deal with this problem, and he would like to expound on the difficulties he is finding in such a survey. Dr. Carrington writes: "For some years now we have had a piece of apparatus consisting of a flowmeter connected to a pressure gauge so that the air pressure is measured before the air actually goes through the flowmeter.

over a period which is regarded as acceptable, say maybe up to two years." (Dr. Carrington has certainly shown that the problems of testing air pumps are not nearly as simple as one might suspect; in fact, it is now becoming quite clear to me why standard methods of testing air pumps are not yet available).

Continuing with the subject of the testing of air pumps, I have received another letter on the subject from Mr. E. J. Small, of Hillside Aquatics. Mr. Small and I tentatively discussed the possibility of setting up large numbers of airstones in, say, a bath, and testing new pumps by seeing how many stones could be operated by any given pump. To carry out such tests one would require a large number of airstones, etc., and Mr. Small decided to try to enlist the help of the Pet Trade Association in this venture. In his letter to me Mr. Small writes: "I am sorry it has not been possible to do anything further on the equipment for testing aquarium pumps. Just before Christmas the



This gives an indication of the pump output at a measured pressure. I have started checking the accuracy of the flowmeter by running the air out of the meter into an inverted bottle of known capacity (24 litres) and so checking the accuracy of the flowmeter after making the appropriate pressure corrections. I have been surprised to find that our flowmeter has a margin of error of anything between 22-35%. When comparing the output from pumps it is therefore important to compare them all with the same meter."

Dr. Carrington continues: "It is also important to realise that output is not necessarily everything. It is easy to improve the output of a pump of given size by overloading the coil and the diaphragm, but this only makes the pump wear out in a very short time. To carry out a survey really scientifically it therefore seems to me that several pumps of each type should be tested

National Organiser of the Pet Trade Association suffered a heart attack; although he has somewhat recovered he has had to resign from his position in the P.T.A., and is at the moment doing only the minimum amount of work to keep the Association ticking over until we obtain a new Organiser. Therefore I cannot ask him to do any additional work at the moment." (Although I do not know the gentleman's name, I am sure that you would like to join with me in wishing him a speedy and complete recovery from his illness).

As a matter of interest, perhaps some of the members of the P.T.A. would care to send me a few lines telling about the objectives and work of the Association. I've often seen the P.T.A. symbol used, but am unsure about the Association's activities. I'm sure other readers would be interested also.

John Evans is 15½ years old, and his home is at

22 Church Street, Up-Holland, Lancs., WN8 0ND. John enjoys the feature very much and would like to have readers' opinions on the care and breeding of convict cichlids. He has just bought four but cannot get them to eat anything at all. Do you have any advice to offer?

Someone else asking for advice is Mr. G. Jay, who writes from 19 Robinson Road, Mapperley, Notts., NG3 6BA. He has an 18 in. x 12 in. x 12 in. plastic tank in which he managed to raise half a brood of goldfish which spawned in his pond. After the goldfish, Mr. Jay decided to try his hand at tropicals and stocked up with the commoner types such as swords, guppies, zebras, etc.; these started to die off for no apparent reason and Mr. Jay suspected "bad" stock; he changed to another pet shop, but again the fishes died off. The second dealer informed him that the plastic tank was at fault, as the higher temperature of

obviously been going on for the full period during which the tubes were in use. As the tubes were manufactured in a foreign country, there is little point in my contacting the manufacturer; however, I hope to contact the British distributor—if I can find out who it is. Fortunately the plastic had no effect whatsoever on the health of fishes or plants).

Photograph 1 shows a young firemouth, *Cichlasoma meeki*, which belongs to an aquarist friend, Mr. Sandy Bodles, 23 Ballysnod Road, Larne, Co. Antrim, as do the other fishes in this month's photographs. My thanks to Sandy for letting me photograph some of his attractive collection of tropical freshwater and marine fishes! What have been your experiences with the keeping and breeding of the firemouth?

I've just received another letter from Mr. R. Kitchen, of Northern Aquarium Products, 11 Dudley Street, Colne, Lancs., and he adds to his previous



the tropicals caused the plastic to "release dangerous oils which killed the fishes." The dealer claimed that he was told this by a scientist from Nottingham University. Despite the above, two neons survived from the first batch, and two white clouds from the second. Mr. Jay says that no aerosol sprays, or the like, were used in the room at the time. He would thus like to have readers' comments on the advantages and disadvantages of glass and plastic tanks. (My only experience with a plastic tank was when I kept some fishes in one, placed in front of a coal fire, during a power cut. The tank melted! I should also imagine that plastic would scratch more easily than glass. I don't know very much about the chemistry of plastics, but I have recently had experience of several plastic filter tubes, which had been in use for about two years, dissolving in aquarium water. The process had

comments, in these columns, on testing aquarium pumps. He writes: "I would like to add to my original comments about diaphragm pumps that not all pumps are adjustable, and power loss on this type was not controllable but was not sufficient to cause concern. . . . I hope that all parties in this branch of the industry can get a standard we can all attain. I do have my own ideas on procedures, etc., and grading methods, and will let you have these if you so desire." (I would certainly be interested to hear from Mr. Kitchen, and shall try to continue to publish any further developments in this important field of interest. Perhaps Dr. Carrington, Mr. Small and Mr. Kitchen could exchange ideas, and see if they have any areas of common ground; this would keep the ball rolling, and no doubt other manufacturers and distributors would then be keen to join in).

42 Mayfield Gardens, Brentwood, Essex, is the address from which Mr. E. F. W. Thurston writes, and he begins: "I cannot agree with B. Whiteside that snails should not be introduced to control *algae*." (Mr. Thurston's comment refers to my article in the February edition, "Dealing with *Algae*," and not to W.Y.O.? I would point out, in my own defence, that I did not say that "snails should not be introduced to control *algae*;" what I did say was "... I certainly would not introduce snails especially to try to control *algae*"). Mr. Thurston continues his letter: "Last year I had a tank with a heavy infestation of blue-green *algae*. All attempts to control it by cutting down light or rigorous cleaning failed completely. Since the plants were obviously being choked by the repulsive, slimy layer covering them and everything else, in desperation I threw in four tiny snails. For two weeks nothing happened, and then quite suddenly tracks through the *algae* layer appeared and it soon became obvious that the snails were having a feast. Within a few weeks the tank was clear—and still is!—and I had a snail population explosion!"

"One particularly interesting feature was how the snails obviously preferred to attack an area of algal growth from the side rather than from above—almost as if they did not like crawling on it. This was why it took two weeks for me to notice any improvement: I failed to find the path they were clearing for themselves. In fairness, however, I must agree with B. Whiteside that snails never seem to have any significant effect on other kinds of *algae*." (Do any other readers have further comments about the growth and control of *algae*?)

Photograph 2 shows the serpac tetra, *Hyphessobrycon callistus*. What have been your experiences with this species?

Mr. S. Hirst's home is at 13 Grindelford Gardens, Gamesley, Glossop, and he wonders if readers could identify a species of fish which he was given. The fish's body "is about 1½ in. long and is all silver except for a black V at the joining of the caudal fin to the body. The rest of the fins are all silver except for a white tip." Mr. Hirst thought that his fish were black line tetras, but he saw some in a local pet shop and then decided that they were not. Any opinions, please?

Paul Mawhinney is 11 years old, lives at 107 Ballypollard Road, Magheramorne, Co. Antrim, and is a member of the Greenland Aquarium Club. Paul writes: "A few weeks ago we got two new aluminium hoods for our school tanks. Those that we had before had been made from steel and they had rusted. Another problem that we had was that the light bulbs in our hoods seemed to have very short lives, and we were having to obtain a large number of new ones. In the end we bought four rough service bulbs, at Mr. Whiteside's suggestion, and although the four cost us 70p we hope that they will last a lot longer than

ordinary bulbs did." (Other readers with similar bulb problems might like to try rough service bulbs. They last much longer, although the quality of the light falls off as the bulbs age; however, they're worth a try if you're having to spend almost weekly sums on ordinary light bulbs).

And now to a letter which should be of interest to coldwater fanciers. It's from Mr. A. H. M. Bear, Winchester House, Shanklin, Isle of Wight, PO37 6HU, and it's the first letter to W.Y.O.? from an Isle of Wight reader. Mr. Bear begins by saying that he considers the common earthworm to be the finest of free fish foods. He says that a damp sack, in the corner of the garden, will yield a permanent supply of high protein live food of all sizes; and he considers earthworms to be one of the best foods for bringing fishes into breeding condition. He has also found it relatively easy to raise brine shrimps to adult size. He recently had several generations, from one batch of eggs, contained in a 25 oz. lemonade bottle. Initially he fed the young shrimps on yeast, but left in the daylight *algae* soon formed and provided food for them. Mr. Bear had kept tropical fishes for around 20 years and had never really been interested in coldwater fishes; but he had the chance to visit the All Japan Koi Show, in 1968, in Tokyo. It was the experience of a lifetime for him! There were thousands of people at the show, and hundreds of magnificent fish. After the show the "top" fish was sold for £9,000! On later visits Mr. Bear went to a Koi farm where the fish were bred in large pools in valleys "which are drained when the leaves change on the trees, for the Japanese believe that the fish change their colour at that time." In reply to a recent query about fish auctions, Mr. Bear says that the bids are made for numbered boxes; the fish are not seen, but the breeders' numbers are known. He wonders if there is such trust amongst British breeders. He would dearly like to try keeping Koi, but he says that they are "out," as he is limited to tanks.

On to the subject of marines with Mr. R. D. Witham, of Enslin House, 10 Cobden Road, Matlock, Derbyshire. (Hope I got the address correct). Mr. Witham says that a number of people in his area have gathered together to form a branch of the British Marine Aquarists' Association. Anyone who lives in the area, and who is interested in the venture, could contact Mr. Witham for news of the latest developments. He would also like to see much more in *The Aquarist* relating to marine fishes, as he considers that articles so far have seemed mainly for beginners. (What is your opinion?)

11b College Road, Kemp Town, Brighton, BN2 1JB, Sussex, heads a letter from Mr. D. Mann, and he recently built himself an all-glass tank. He is delighted with the end product, but is very worried about the sharp edges of the glass. In an advertisement in the October edition he noted that a tank is available with a

"heavy duty high impact polystyrene frame," and he wonders if this sort of framing could be bought on the open market, in strips, so that the average do-it-yourself aquarist could glue this around his own home made tank, thus achieving his own "cream of aquaria." Having considered the idea of a fortnightly *Aquarist*, Mr. Mann has his doubts; he has a lot of trouble in obtaining his once per month. He usually obtains his in either the third or fourth week in the month of publication. He has changed his newsagent three times—but to no avail. He wonders if other Brighton readers have met with similar problems, and would like to be put in touch with a reliable newsagent. (Why not order your copy by post, direct from "The Aquarist" offices? That's how I receive mine each month and it always reaches me in good time. Other local aquarists have often asked me the same question. Admittedly it costs a bit more to have the magazine posted to your home—£3.06 yearly, £1.53 half-yearly—but it always arrives in good time and one never misses an edition. In my opinion, it's well worth the bit extra to know that my copy will arrive—and on time!).

Mr. M. J. Sexton lives at 32 Common Lane, Thundersley, Essex, SS7 3TD, and he would like to see a list of all available fishes published in *The Aquarist* each month, together with their current or average prices, to see how much he would have to spend if he wanted any particular fish. At the moment he finds it best to "shop around." (I do not think Mr. Sexton's idea would really work, as there are so many variables in the aquatic trade—as there are in many other trades. The variations in the actual retail prices of photographic and hi-fi equipment are good examples—and the sale of live fishes must raise even more complex problems, as, possibly, prices may fluctuate due to supply and demand. Perhaps dealers would care to send me their comments for publication in a future feature?).

Master J. Lee is 15 years old, and his home is at 75 Bachelor Gardens, Harrogate, Yorkshire, HG1 3EA. He is particularly interested in catfish species and would like to know if there is any specialist catfish society which he could join—or, if not, if there are any aquarists who would be interested in forming a British catfish society. (Let me know and I'll include details in future columns).

Mr. C. S. Nutley lives at 4 York Road, Richmond, Surrey, and he would like to hear from anyone who can give him any information about the keeping of axolotyls, or about any books which deal with these amphibians. (In my opinion, this creature is rather ugly; however, no doubt it has its attractions. I'd be interested to hear from readers who keep, or have kept, this amphibian. Just what are its attractions?).

Yet another request for information, and it comes from Mr. G. W. Allen, of 29 Normanby Drive,

Connahs Quay, Deeside, Flints. Mr. Allen writes: "I wonder if through the medium of your column I could find anyone who is able to supply me with the fish known as the mosquito fish—*Heterandria formosa*—which I am told is the smallest live bearing fish. I have been trying to find the fish for some time now, but with no success. I am in complete agreement with the opinion of Mr. J. Miles (October, 1972, edition) regarding more space for W.Y.O.? and that News from Aquarists' Societies is surely a little-read part of the magazine.

Photograph 3 shows a male red swordtail in fine form. I'd be interested to have details of your observations on fighting behaviour amongst male swordtails—of any colour.

And finally, with 26 interesting letters still unused this month, a tip taken from a longer letter from Mr. K. R. Grayling, who lives at 8 Goulton Road, Clapton, London, E5 8HA. Mr. Grayling writes: "If you've just had fried eggs for breakfast, use the small quantity of raw egg-white left in the shell to mix with any flaked food to a mushy paste. This is a very high protein food which all our fishes like, and which does not disintegrate nearly as fast as ordinary flaked foods." (It's certainly worth a try!).

I hope that you, like me, were interested in the photograph of the powder-blue surgeon which I used in last month's feature. I was speaking to Bob Crossan, its owner, earlier this week, and he told me the sad news that his fish, which he had had for over a year, had died when he moved it to a larger tank. Most of us, who have lost a favourite fish in the cheaper price range, will know how it must feel to lose a very expensive, favourite fish. A photograph isn't much of a substitute.

For next time please let me have your opinions on the following topics: (a) Of all the fishes which you have ever kept, which has been your favourite—or which do you remember best—and why? (b) What are the main advantages of using an air stone in an aquarium? (c) When did your tortoise awaken from its winter sleep? (d) What forms of pond life (other than fishes), which could be kept in an aquarium, would be of interest to school children? (e) I recently managed to breed one species of killifish. What have your experiences been with the breeding of killifishes? Please PRINT your name and address on letters, and add the date. If your letter has not yet appeared, it may well do so next month. By the way, although I'm always willing to give a personal reply to readers who enclose a S.A.E. with their queries, and to publish requests for information in this feature, I would prefer to restrict my answers to queries of a general nature, or to queries concerning aquarium plants. Queries concerning tropical or coldwater fishes would be best directed to Mr. Boarder or Mr. Hems, both of whom are experts in the field. Good-bye until next month!



REARING THE JONES'S ZONURE

by H. G. B. Gilpin

WHILE BROWSING around a pet shop last August, I was attracted to a vivarium containing some Spiny-Tailed Lizards and several species of Zonures. The latter were in exceptionally good condition, healthy looking and reasonably active. A Transval Zonure and a Jones's Zonure, both females, seemed considerably plumper than one would have expected and, stimulated by the possibility that they might be carrying young, I bought them.

On reaching home they were installed in a 30 inch long aquarium, already inhabited by a small Iguana and three Viviparous Lizards. A careful watch was kept for several days in case of possible aggression. No trouble, however, and the Zonures quickly settled down in their future quarters, completely ignoring

the original inhabitants who, in turn, took no notice of the new arrivals. The temperature of the vivarium was maintained at just over 70°F. by means of two electric light bulbs, one of 25 watts and one of 40 watts.

At this time I was particularly interested in the Jones's Zonure. Although drab in colour it is a fascinating creature, encased in an "armour" of rough edged, plated scales on the back and stout rectangular scales along the underside. In addition it possesses a heavily spiked tail which looks as though it could prove extremely discouraging to a small predator intent on converting the Zonure into a meal. Ridges over the piercing, dark eyes and spines protruding from behind the head further

suggest that this creature is not to be trifled with, except under strong provocation. Dorsally it is a greyish-brown colour, relieved by dark patches, and ventrally a pale cream. Its stout body is both wide and deep and measures five inches from the tip of the nose to the root of the tail. The tail itself is two inches long, thick at the base and tapering to a fine point.

Initially the lizard was provided with mealworms, Tenebrio beetles, stick-insects and woodlice. It showed a marked preference for the *larvae* and little interest in the stick insects. Subsequently it fed freely on locusts ranging in size from newly hatched hoppers up to the third instar. It has been seen to drink on a number of occasions, lapping water from a shallow vessel sunk in the gravel covering the floor of the vivarium, with its short, thick tongue.

While not an active lizard, the Jones's spends much of the day in full view, sprawled across a rock which rises gently from the floor level to within a few inches of an electric light bulb, or clinging to a bark-covered branch originally installed for the benefit of the iguana.

It does, however, occasionally disappear into the cavities below a pile of rocks, sometimes for hours at a time. Early in October the Jones's failed to put in an appearance for a longer period than usual, in fact for so long that fears were felt that it might have crept into some hidden corner and died there. All was well, though, and before a search was begun it reappeared, still looking in the best of health, but to my mind slightly thinner than when I last saw it. An explanation was soon forthcoming. On the 19th of the month a baby Jones's Zonure was seen basking on a rock. The little animal was surprisingly large considering the modest dimensions of its mother. It measured 2½ inches in overall length and its tail was shorter in proportion and considerably more spiky than that of a Transval Zonure of comparable age. A chequer-board pattern of light fawn patches spread over its dark brown dorsal surface, contrasting with the ochre-yellow under surface and the yellowish edge of the upper jaw.

In general shape and make-up it closely resembled the adult but its basic colours and markings were brighter and more distinct. It was extremely nervous and the slightest movement outside the vivarium sent it scuttling for shelter.

During the following week three more baby Jones's Zonures appeared in the vivarium, two of them equal in size to the first-born and the third slightly smaller.

At this stage their mother, though thinner than she had been before their arrival, was not markedly so and it seemed incredible that she could have produced four such relatively enormous babies.

I had previously bred Transval Zonures and it was interesting to compare the two broods. While similar in shape, the markings on the Jones's were

more distinct and the animals were far more nervous and retiring than their rather larger relatives.

Although previously the Iguana had made no attempt to attack the other inhabitants, it seemed unwise to leave so much larger a lizard with the young Zonures and it was transferred to another vivarium. The adult Zonures showed no interest in the babies and, after considerable hesitation, it was decided to leave them all together. Subsequent events justified this.

Fortunately, at the time the baby Zonures arrived, several pods of locust eggs had hatched and I had a good supply of newly born hoppers and small meal worms. The wide mouths of the Zonures enabled them to cope with these insects and *larvae*. Fruit flies were also plentiful and were eaten freely.

The Zonures, now three months old, are all strong and healthy and if anything rather over-plump. They are far less nervous than they were and spend most of their time in the open parts of the vivarium. Adults and babies continue to live amicably together and constantly demonstrate the tendency of these lizards to pile themselves one on top of the other. It is by no means unusual to see a "four storied" sandwich of Zonures on the flat top of one of the rocks, often with one of the smaller individuals on the bottom.

The babies are far less timid than they were originally, though still be no means tame. They will ignore an observer outside the vivarium but raising the lid, preparatory to introducing a hand into their domain, is sufficient to send them rushing for cover amongst the nearest pile of stones.

Crossword Solution

R	U	B	Y	S	S	T	E	T	R	A		
E		E	H	A	C	E		O				
T	I	N	T	R	E	N	D	P	A	I	R	
I			C	U	B	A						
C	U	R	E		B	O	A	T	M	A	N	U
U	O				N				A		S	U
L	E	B	I	S	T	E	S	T	I	N		D
A	S				S	T			F	E		
T			A	S	S	C	I	C	H	L	I	D
U	R	N			P				G		S	I
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PRODUCT REVIEW

King British Foods, manufactured by King British Aquarium Accessories Co. Ltd., Cannon Mills, Union Road, Bradford, Yorkshire, BD7 3HW.

Since its introduction, just over a year ago, many aquarists have come to appreciate the value and quality of King British Vit-A-Min Every Day Flake food. A recent press release from the company informed me that they have been repeatedly asked by the general public for a larger version of the flake food to feed bigger fishes. As a result, the company's technical director, Mr. Gordon Holmes, assisted by production staff, has led the research into making a larger flake. The result is certainly the largest flake food which I have ever seen—and possibly the largest large flake currently available to the fishkeeping hobbyist. The food contains: mosquito *larvae*, shrimp meal, soya meal, *algae*, crab meal, *tubifex*, liver, whale oil, anti-oxidants, fish meal, crustaceans and bulk roughage. This high protein food's analysis is given as: protein, 49 per cent; minerals, 10.9 per cent; crude fat, 8.7 per cent; moisture, 6.5 per cent; and crude fibre, 1.5 per cent.

On comparing the given analysis with that of another British food, and with that of a popular foreign food I found that the Vit-A-Min Large Flake food came out best of the three! The larger flakes are just that, some of the largest being at least 1 in. square in the samples which I tested. They offer a good-sized meal, in one piece, for the bigger fishes which one may keep—yet the flakes are such that they can be very easily crushed between finger and thumb to suit fishes with smaller mouths and appetites. The flakes will not cloud the water in one's tank. For large fishes such as adult oscars, *Tilapia*, etc., one can use the flakes straight from the tin; for smaller fishes such as adult angels the food can be broken down to appropriate sizes.

As well as producing a large flake food, the company have produced king-size tins of the new food—together with king-size tins of three of their other foods. The Large Flake Vit-A-Min comes in a 6 oz. tin, with a recommended retail price of £1.16. The Every Day Flake Vit-A-Min is now available in an 8 oz. tin with a R.R.P. of £1.16. Using either food, the makers recommend that fishes are fed at least twice daily. King British Pure Shrimp Tablets are composed of accelerated freeze-dried pure shrimp, and were first marketed 2½ years ago. The press release states: "This was one of the first dry foods to be recognised as a safe food for the marine enthusiast to offer to his valuable stock." These tablets have been found to be popular with both marine and freshwater fish keepers, and in response to demand the tablets are now offered

in 7 oz. tins, R.R.P. £1.89. The tablets are said to be: "... ideal for controlled feeding: each contains sufficient food for some 20-25 medium-sized fishes." The feeding instructions given are: "Drop the tablet into the aquarium; it will sink and disintegrate, allowing continued feeding over an extensive period of time." To complete the king-size range, King British are offering a 4 oz. tin of well-established freeze-dried Thames red *tubifex* worms, R.R.P. £1.89.

Distribution of the new sizes has been given careful attention, and stocks are now held by more than forty wholesalers throughout the country. According to the press release, reception to the new sizes has far surpassed the company's expectations. The Managing Director, Mr. Keith Barraclough, said: "We are delighted with the opening response, our original packaging order being completely cleared out before the products were offered to the general public."

I tested each of the foods with a variety of my own fishes and I was certainly more than pleased with the apparent greedy relish with which the foods were consumed. I know that hungry fishes will eat almost any food—but my own fishes greedily consumed all of these new foods even after having been fed soon before with other foods; and they were equally as keen to consume these foods as a regular diet over an extended period. With such large tins of food one can obviously save money.

Although I was unable to test the foods with marine fishes, I had an interesting time watching my freshwater tropicals consume the foods. My large Gouramies and climbing perch were very keen on the large flakes, and smaller fishes were equally as keen on the Every Day flakes. The *tubifex* worms were greedily attacked by my discus and angels, as well as by the Gouramies and perch. Killifishes also scooped up the *tubifex*. I found the shrimp tablets to be ideal for bottom-feeders such as catfishes, and I noted that both ordinary black, and green sailfin mollies spent ages browsing on the bottom consuming the shrimp—which very quickly disintegrated. My concern that the shrimp might cloud the water was totally unfounded; the food was so greedily eaten—and so quickly—that none remained after a few minutes. I also found it quite easy to halve a shrimp tablet where a whole one might have been too much for a couple of fishes. A half tablet was also easily crushed between finger and thumb, and the resulting particles floated long enough for surface feeders to get a good meal; pieces which sank were either eaten on the way down, or eaten on the bottom by fishes which inhabit this region.

I can recommend each of these foods without

reservation—and the sample tins which I received should ensure that I don't have to buy any more fish foods for quite a long time. Whatever kinds of fishes you keep I'm sure that they should find one or several of the foods in this range to be very much to their liking—and the variety, contents, analysis and quantity should ensure good growth and good health.

Wisa 300 Air Pump, manufactured in West Germany, distributed by Hillside Aquatics, 29 Dixons Hill Road, Welham Green, nr. Hatfield, Herts., price £21.50.

Some months ago, in a brief review, I wrote a few lines about the Wisa 300 air pump. Recently I was supplied with one of the pumps, and I have had the pleasure—and it has been a pleasure!—of examining and trying out the pump for myself. For the average aquarist to spend £21.50 on an aquarium pump, the pump would need to be a very good one. I consider the Wisa 300 to be just that! Here is a piece of machinery which should please even the most discerning aquarist.

The pump is described as "the most powerful and noiseless vibrator pump in the world". Naturally, there must be very many aquarium pumps in the world which I have not seen; despite this I feel fairly sure that the distributor's claim is justified! One might imagine that a pump which is claimed to be "the most powerful . . . vibrator pump in the world" would be relatively large and clumsy; nothing could be further from the truth. Although the Wisa 300 weighs almost 6 lb., it is only about 8 in. \times 3½ in. \times 4 in. in size and has a very attractively finished metal base and body. It is supplied with four rubber feet to cut down vibrations to a minimum—and this is certainly the case.

On the top of the pump is the air inlet. It is held in position by a sturdy screw which can easily be loosened to change the pump's air filtering medium. Unlike many other air pumps, which require special air filter pads which are sometimes difficult to obtain, the Wisa 300's air filter medium is ordinary surgical wadding—i.e. cotton wool—and only a tiny ball is required for a complete change. The change of filter wadding can be done in a matter of seconds—literally—and a check to see if the wadding needs changing takes as little time. (Glass wool and nylon wool should not be used; the former's splinters can cause blocked valves, and the latter lets dust through to the pump's works).

What of the working parts of the pump? I quote from a six-page leaflet which has been prepared on the Wisa range. (Copies of the leaflet are available from the distributor.) "The electro-magnet and the armature are mounted on a heavy casting. Both are of special design and the new method of attraction generates a large and powerful oscillation of the

armature. Half of this movement is transferred with twice the force on to a large diaphragm. This was designed specifically for this purpose and is made of a well-proven composition which is wholly ozone resistant and has a long mechanical life. The valves, made of the same material, are quite simple in design, and for this very reason they are absolutely reliable. Owing to the compact arrangement of the components, the pump is really very small, having regard to the size of the individual parts, and its performance. All the components are robust, firmly fixed, and not subject to wear and tear, so that the pump becomes as good as new after replacement of the diaphragm and valve plates."

The pump is claimed to operate 50-75 diffuser stones. As I do not have anywhere near this number of diffusers in my set-up, I must take the leaflet's word for this. All I know is that by using this pump I was almost able to blow my fish out of their tanks. Fortunately the 300 model is fitted with an external pull-out adjusting knob with which to adjust the air output to whatever level may be required. It can also be used to cut down unnecessary load on the diaphragm when less than 300 litres of air per hour are required. I must admit that I was really astonished by just how quiet this powerful pump was in operation. I considered the ordinary, small diaphragm pump which I normally use to be quite quiet; when compared with the Wisa 300 my own pump sounded like a lawn mower; yet I was able to adjust the Wisa to operate all of my tanks' systems, with loads of air left over—and the noise of the air bubbling in the water was the only sound which could be heard. A non-aquarist visitor, who arrived when I had just switched the pump on but had not connected any air line, was asked for her opinion about the sound from the pump. "Is it switched on?" was her reply. When told that it was, her remark was that she could only hear a hiss of air. This, I think, gives a good indication of just how quiet this pump is. When the air output from the pump is cut down, its normal power consumption of 5 watts at full power is cut down to 1.5 watts.

"... this apparatus is the ideal pump for smaller installations, meeting the most exacting requirements," states the pump's leaflet. I could go on for quite a bit longer praising this pump; I'll resist the temptation. If you require a diaphragm pump of exceptional quality, quietness and air output, and are prepared to pay £21.50 for it, then I suggest that you send to Hillside Aquatics for their leaflet, which gives even more details. Better still, ask your local dealer to let you see and hear one in operation. I feel sure that the pump will please you as much as it pleases me. I recommend it without hesitation—even if you don't need to use it at full power. This pump anyone could live with!

B. WHITESIDE.

MARINE QUERIES

by Graham F. Cox

QUESTIONS

WOULD YOU kindly answer the following questions for me:

- (1) Can I use freshwater gravel of a suitable size instead of white silica gravel?
- (2) How can I determine when to add additional trace elements?
- (3) What is the cause of "Popeye" in coralfishes?
- (4) What are Mysus shrimps?
- (5) How many fishes per gallon? My dealer says one inch of fish per four gallons of water. Does this mean that my 25 gallon tank could hold 6 ins. of fish—say three fishes at 2 ins. each?

ANSWERS

1) The following filtrant substrates are all suitable for use in a sea aquarium: (a) Crushed shells, (b) white silica, (c) brown gravel (silica), crushed limestone, (d) coral sand.

The reason why most people use white silica gravel in marine aquaria is that being pure silica it continually replenishes the silica content of captive seawater as it is being removed by micro-organisms within the system. In addition, being pure white, it gives a natural appearance and makes the most of the tank's lighting system. However, chemically, the common brown beach shingle which you have at the moment is just as suitable as the white silica. Ideally, two grades are required— $\frac{1}{2}$ ins. means particle diameter as the first 1 in. layer on the sub-gravel filter followed by at least two inches of the finer $\frac{1}{8}$ in. \times $\frac{1}{8}$ in. mean p. dia.

(a) Crushed shells, (d) crushed limestone and (e) coral sand are all forms of the compound calcium carbonate (Ca CO_3) and as such are most useful for the replacement of calcium ions depleted from seawater by various organisms. This tends to stabilize the pH of captive seawater. **Unfortunately, however, what few marine aquarists seem to realise is that alkali reserve depletion in ageing captive seawater is caused just as much (if not more so) by magnesium ion depletion as by the removal of calcium ions.**

It will be readily perceived, therefore, that if crushed coral, crushed shells or coral sand is used as the filter substrate, to the exclusion of siliceous gravel, then silicon ions will not be returned to the water. In addition, and to much greater consequences

as far as the culture animals and plants are concerned, although both calcium and magnesium ions are being depleted (i.e., the "alkali reserve"), **only calcium ions are being replaced.** In a closed-circuit marine biosystem filtered solely by coral sand, therefore, a gradual imbalance between calcium, silicon and magnesium ions will result. This will have grave consequences for the more delicate creatures in the aquarium, and in time even hardy fishes may be damaged.

I well remember a customer in Yorkshire being advised by a member of the teaching staff of a well-known Northern University to use potassium hydroxide (KOH) as a pH adjusting solution for the seawater in his tanks. If this lecturer had had even a basic knowledge of the chemistry of seawater, he would have been aware that the concentration of potassium ions in seawater rarely exceeds 400 parts per million in any ocean. Furthermore seawater's retention of potassium ions is as high as 1.6 per cent.

Our customer was using a British synthetic seawater, which as produced, already contains 382 parts per million of potassium. As you may imagine, the days went by and the potassium ion content slowly mounted higher and higher as the aquarist continued to ladle potassium hydroxide into his tanks. Slowly but surely the potassium ion imbalance began to disturb the fishes metabolism, and particularly the normal functioning of the central nervous system.

At first the fishes went off their food; two days later they were exhibiting overt photophobia and hiding continually. Ten days after the first anorexia manifestations, the aquarist returned from work normally, ate his evening meal and retiring to his fish room, turned on the tank's main lights for the evening—a routine which had occurred without incident for the previous four years. On this evening, however, as soon as he threw the light switch all Hades erupted. The fishes began to smash themselves into the concrete walls of the tank and half a dozen or so large valuable Angels, Butterflies and Surgeons (the tank held almost 1,000 gallons), leapt clean out of the water and crashed dead onto the floor. The aquarist telephoned for advice, and after hearing about the use of potassium hydroxide as a pH adjuster, I recommended that this cease immediately, that a proprietary brand alkaline-

adjusting fluid be used instead and that a 100 per cent water change be effected as soon as the freshly prepared synthetic seawater had matured. This advice was followed and *at once* things returned to normal.

I have recounted this lengthy story to show you how disastrous an ionic imbalance can be in a fluid as complex as seawater, when the latter is used to maintain marine life in a closed-circuit system.

In view of the above, I always recommend a mixture of coral sand (or crushed shell) and white or brown silica gravel. The proportions are not too important, but in order to remedy the magnesium ion depletion, a 25 per cent water change should take place every 3-4 months and a good trace element booster and pH adjusting solution should be used as directed. Incidentally, a good "bonus" from the use of some coral sand or crushed shell in the filter gravel is that both substances usually retain a little nitrifying bacteriological activity and the maturation period of a new marine aquarium is thus reduced.

Finally, on this subject, it goes without saying that the inordinate lengths that many specialist freshwater fanciers go to secure "lime"-free (meaning calcium carbonate-free) gravel for their aquaria, are unnecessary when considering gravel for the sea aquarium.

(2) If you are using either of the British synthetic seawaters (i.e., the only ones of which I have precise formulation data), trace element booster should be used at the rate of one drop per ten 10 gallons per week. This dosage should not commence until the seawater is one month old, as sufficient of all anions and cations are present in both formulations to last for this period. **Please remember.**—If you have read the foregoing carefully you will know that the ionic content of seawater is critical, therefore—**do not overdose or underdose with the trace element booster.**

(3) The exophthalmic or "popeye" condition in coralfishes is certainly not caused by over-aeration of seawater. I have swum on the edges of reefs where breakers coming in pounded the seawater to a maelstrom condition. The water in the area was supersaturated with air, and yet coralfishes of all types swam around in perfect condition and health.

Exophthalmia in the sea aquarium is caused by organic pollution of the seawater. This can come about by either:

(a) Overfeeding. (b) Inadequate bleaching of gravel, shells, corals, etc. (c) A dead fish rotting away somewhere. (d) A fish (Grouper or Triggerfish) regurgitating unwholesome food behind a rock or coral head, etc., etc.

This excess nitrogenous matter in the seawater quickly gives rise to large populations of various bacteria. One or more species which may occur is pathogenic (i.e., disease-causing) and is believed to damage the fine blood vessels (capillaries) in the

eye, allowing gases to "boil" off into the orbital void and producing the familiar distended condition of the eye.

The treatment is as follows:

Stop all feeding immediately—this reduces the nitrogenous-matter content of the water. Turn all aeration and filtration to maximum—this raises the oxygen tension. Black out the tank totally for three days—this rests the eyes. The drapes are slowly removed three days (preferably at night in a blacked out room) and the following morning will usually find the fish back in perfect condition.

(4) 'Mysus' shrimps are pelagic crustaceans common in many parts of the oceans. Recently they have become available in a frozen form and make an excellent change of diet from chopped liver, steak, earthworm, white worm, *Tubifex*, mussel, etc. They cannot be bred on a small scale in the home, however, and there is much evidence to suggest that in common with other non-sterilized sea-foods they may introduce pathogens into the marine biosystem.

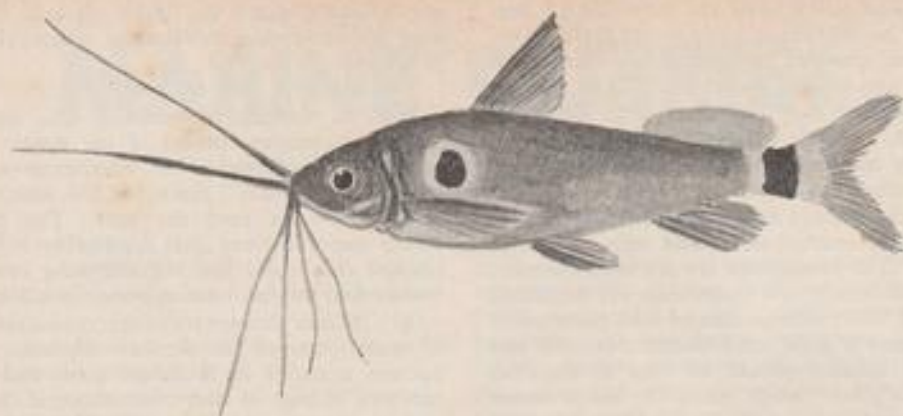
(5) Your dealer is indeed a wise man. By advising you to limit your initial stocking ration to one inch of fish to four gallons of water (and preferably Damsels at that) he has ensured that you will not go far adrift in your early ventures into marine fish-keeping.

The reasons for telling you this are as follows:

(a) Of the smaller fishes, only Damsels will survive the nitrite reading you are going to have in the first few weeks after setting up the tank and before it matures bacteriologically.

(b) The nitrite reading will give rise to a large population of tiny dinoflagellate protozoans belonging to the *Oodinium* genus. These attack the fishes gills and should be killed by alternate day treatments with 'Cuprazin' whilst ever the nitrite reading persists. The reasons for advocating so few fishes are that, in the first place, the *nitrite* toxins derive from the fish's own excretion and weaken the fish, so lowering its resistance to the *Oodinium* pathogens. Secondly, if only a few fishes are present in the aquarium, the ratio between the number of hosts and the number of parasites is kept within satisfactory limits. Giving you an analogy to explain this, one could say that if you had a rifle and only one round of ammunition (regard the bullet as an *Oodinium* parasite) your chances of hitting one fish alone in a large pond would be slight. If on the other hand you were presented with a thousand fishes in a small pond, you would almost certainly secure your supper.

Finally, once your aquarium has matured, and no nitrite reading persists after seven days, you **could** increase this stocking margin to one inch of fish to two gallons of water. However, I wouldn't advise you to do this until you've had at least six months experience of marine fishkeeping.



A PRETTY CATFISH

by Jack Hems

PERHAPS some reader will be able to tell us the scientific name and range in the natural state of a catfish that first appeared on the market about two years ago. It is a typical pimelodid in outline, that is to say long and tapering from the highest point of the dorsal ridge to the base of the tail. The general colour is a warm reddish brown darker above than below that shades to a silvery belly. A vertical black bar margined on both sides with ivory white adorns the caudal peduncle. A similar marking, with the anterior margin shining silver to white gold (according to the direction of the light) is positioned behind the gills. The anteriorly placed dorsal, small-based anal, ventral and pectoral fins are clear with dusky foreparts. The adipose fin is long-based. The mouth is provided with three pairs of whip-like barbels. The body is devoid of scales. It is one of the prettiest of catfish. And seemingly well-behaved too.

It is not a seeker of the limelight and prefers to keep hidden away during the day. But at night it is active

on the bottom. Its nightly appearances are worth waiting for. It is, however, like Robert Burns' mouse, a timorous beastie, and will vanish in a flurry of sand or sediment if you commit the indiscretion of too closely approaching it.

The specimen I have owned for about a year is roughly three inches in length. I hope it does not grow much larger. Very few fishes of the family *Pimelodidae* (that is those known to the tropical aquarium keeper) grow to more than a foot. And while the big fellows will look upon smaller fishes as heaven-sent provender, the less dangerous sized pimelodids—those averaging four to five inches are well-behaved and make good occupants of a community tank stocked with fishes such as well-grown platys, *pristella*, and the like. In general, pimelodids are not faddy feeders, but they do flourish best on a diet of small worms, white or red, scraps of raw red meat, live *Daphnia*, and the better types of dried food such as protein—and vitamin—rich flake.

OUR READERS WRITE

continued from page 15

Fact or Fiction?

I live in an aquarist's backwater, although with co-operation between clubs, and with more dealers trading in East Anglia, this is gradually changing. Initially, without personal contact with established authorities on fish-keeping, it makes good sense to study as many books as possible. Borrowing from the local library is the cheapest way to achieve this, but it is preferable to own books, so that comparisons of particular aspects can readily be made. Book reviews are valuable, but of limited use, as usually, only one or two books are directly compared.

The primary need for the novice aquarist is straight fact or, if this is not available, the opinion of a group of reliable aquarists. I continue to be confused by the variety of advice, which is often presented as fact. In some cases, this can lead to serious trouble. For example, it is essential to establish the overall metabolic activity (simplified to size of fish) a given size of aquarium will sustain. In one book the author suggests the following two selections of fish for the beginner to put in an aquarium 24in. by 12in. by 15in.:-

- | | |
|---------------------------------|-----------------------|
| 1. 3 platys (2 males, 1 female) | 2. 2 red swordtails |
| 3 tiger barbs | 3 ruby barbs |
| 3 serpa tetras | 3 Belgian flag tetras |
| pair dwarf gouramies | 3 black widow fishes |
| 3 flame fishes | 3 oblique fishes |
| 2 cutfishes | 3 small angel fishes |

As shown, guidance to the sub-species was given for this reasonable number and size of fish. However, for the same sized aquarium another author suggests:-

- 6 livebearers
- 6 barbus species
- 6 characins
- 4 rasbora

- 2 gourami
- 1 male fighting fish
- 4 small angelfishes
- 2 catfish
- 1 algae eater or loach.

Aquarists know the range in size of fish which could be included in the above selection! To be fair, the second author suggests that the advice of the local dealer be sought. However, with thirty-two fish swimming about, I think the novice will be lucky if:-

- (i) any fish grows and shows well;
- (ii) there is no disease problem;
- (iii) the fins of some species do not get nibbled.

The end result will be one less aquarist. This book, published in 1969, was reprinted in 1970 and 1971, so it must have been bought by many budding aquarists.

One cannot reasonably expect quantity and quality in a cheap book, but some appear to be much better value than others. What we need is a "Which" Report on the ratio of fact to fiction in each book. It would be extremely valuable if a panel of intelligent aquarists were to write three reports (divided into cheap, moderately priced and expensive books), which compared the factual accuracy and quality of presentation of books commonly available.

MIAHCEL DURRAN,
22 Dale Tree Road,
Barrow,
Bury St. Edmunds, Suffolk.

Retirement

I hereby give notice of my retirement as Curator of the Aquarium and Reptilium at Belle Vue Zoo Park on the 23rd February, 1973, and will be emigrating to New Zealand on the 24th April, 1973, to settle there.

W. TAYLOR,
Curator,
Aquarium and Reptilium.

ADVANCE NOTICE

THE FEDERATION OF NORTHERN AQUARIUM SOCIETIES
are proud to announce



THE 22nd BRITISH AQUARISTS' FESTIVAL

will be held once again at Belle Vue Zoological Gardens, Manchester

on

SATURDAY AND SUNDAY - 13th, 14th OCTOBER, 1973

FURTHER DETAILS SHORTLY

THE EUROPEAN CATFISH

by A. Boarder

THE QUESTION AS TO whether the European Catfish is likely to become established in Britain is an intriguing one. That there is some evidence that fish of this species have been caught in various parts of the Country is undeniable. Although it has been suggested that some of the catches may have been of fish dumped into the waters by aquarists, there is plenty of proof that they may have bred in some of the canals or even rivers.

Before going into the actual problem it may be of interest to give some particulars of the fish in question. The European catfish (*Silurus glanis*) is found in many of the lakes and rivers of Central and Eastern Europe and Western Asia. It can reach a considerable length and some of over nine feet long have been caught. Their weight can be quite considerable, too, as one caught in this Country topped the scale at 43½ lb. The shape of the fish is of the usual catfish type, being long and rather narrow. The head is almost shark-like in appearance and the body tapers away to the rear. It has three pairs of barbels and so can be considered a bottom-feeder. The dorsal fin is small and placed well forward on the back. The anal fin is very long, running along almost the rear half of the body. The main colour is a dark olive-green to blue-black on upper parts with a pale belly. Overlaid on the darker parts are spots or blotches of darker colours. The colour appears to vary quite a lot from location to location.

It is said that the European catfish was first introduced into England in 1865, and these were put into a pond at Twickenham. However, there does not appear to be much evidence as to their ultimate fate. In 1907 some were introduced into Tring reservoirs by Lord Rothschild. These were placed in the Marsworth reservoir, which is one of the Tring group. I was told by the late "Jimmie Street," who was gamekeeper to Lord Rothschild, that two large ones had been found dead a year or two after. Although I knew these reservoirs well and have fished them, I never heard of one being caught in them. It was thought that the stock must have died out, but on 26th September, 1970, a catfish of 43½ lb. was caught by a Mr. Richard Bray, in Wilstone Reservoir, nr. Tring. This reservoir is one of the group comprising:

Marsworth, Star Tops End, Little Tring and Wilstone. The first three are very close together and the last one is about a mile away. These reservoirs are for feeding the Grand Union Canal, and there is some connection between them. The Wilstone one can supply Little Tring and is also pumped from to feed the main canal via the Wendover Arm.

If the fish which were introduced into Marsworth reservoir did breed it is quite easy for any fry or small fish to go over the overflow into Star Tops End reservoir. This one has a direct link through a paddle to the canal. Also any water from Wilstone can be pumped into the main canal. Even Marsworth reservoir has a direct link with the canal, as an underground stream flows from the Chilterns through culverts across the canal and into the reservoir. This could afford access to the canal for small fish.

I have heard of catfish being caught in the Grand Union Canal and one of 17 lb. was caught in the River Wissey in Norfolk in August, 1953. One of 33 lb. was also caught in this country some time ago. The latest catch I have heard of was from the Huddersfield canal, at Stoney Battery. The question is, can these catches be traced to the Marsworth reservoir? If we consider the network of canals running over a very large part of the country, it is easy to realise that fish could have moved right up to Yorkshire and beyond by means of canals and rivers.

Even the River Thames could be populated by these fish, as there are direct junctions with the river to the Grand Union Canal at Limehouse and Brentford. Other canals connect to the following canals: Slough Branch, Aylesbury Arm, Nottingham, Derby, Avon, Worcester, Gloucester, Kennet and Avon, Leicester, Shropshire Union, Chesterfield, Macclesfield, Aire and Calder, Lancaster, and various rivers such as the Trent and Nene. In fact, there are so many smaller canals, especially around the Manchester area, and these have connections with some rivers, that the possibility of fish travelling over the whole of the country is very feasible.

The fish is a night-feeder and so it is quite possible that this may be the reason why so few appear to have been caught. I shall be glad to hear of any obtained and from where.



from AQUARISTS' SOCIETIES

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

RESULTS of the Aireborough and District Open Show were as follows: **Furnished Aquaria:** 1, M. Fryer (Halifax); 2, Mr. Silk (Independent); 3, Mrs. Vasey (Blackpool). **A.V. Livebearer:** 1, Mr. Williams (Swillington); 2 and 3, P. Hornshaw (Harrogate). **A.V. Barb:** 1, Mr. Vause (CAS); 2, D. Foster (Don Valley); 3, Mr. R. Foster (Cresswell). **A.V. Cichlid:** 1 and 2, D. Taylor (Harrogate); 3, D. Foster (Don Valley). **A.V. Characin:** 1, M. Cook (Harrogate); 2, Mr. Williams (Swillington); 3, Mrs. R. Foster (Cresswell). **A.V. Anabantid:** 1, B. Lydon (Keighley); 2, Mr. and Mrs. Povey (Blackborough); 3, Mr. and Mrs. Dickinson (Cresswell). **A.F. Carps and Minnows:** 1 and 3, Mrs. Moss (Independent); 2, Mrs. R. Foster (Cresswell). **A.V. Catfish and Loach:** 1, P. Hornshaw (Harrogate); 2, J. P. Baker (Welbeck); 3, Mrs. M. Povey (Blackborough). **A.O.V.:** 1, Mr. and Mrs. Holmes (Welbeck); 2, D. Lawson (Aireborough); 3, D. Barrett (Welbeck). **Breeders (Guppies):** 1, B. Tate (Aireborough); 2, Mr. Toynne (Sheffield); 3, T. Douglas (Hull). **Breeders (Swordtails):** 1 and 3, T. Douglas (Hull); 2, G. Andrews (Hull). **Breeders (Mollies):** 1, H. Hubbard (Peterlee); 2, J. Igoe (Sherwood); 3, Mr. and Mrs. Blades (Huddersfield); 2, Mr. and Mrs. Danes; 3, S. Hall (Aireborough). **Breeders (Barbs):** 1, S. Clark (Independent); 2, B. Tate (Aireborough); 3, Mr. and Mrs. Toynne (Sheffield). **Breeders (Characins):** 1 and 2, Mr. Sonley (Independent); 3, Mr. and Mrs. Cohen (Castleford). **Breeders (Cichlids):** 1 and 2, J. Abbott (Swillington); 3, R. Dymon (Piterswood). **Breeders (Anabantids):** 1, A. E. Whitlock (Doncaster); 2, Mr. and Mrs. Swipman (Grantham). **Breeders (Carps and Minnows):** 1 and 3, Mr. Sonley (Independent); 2, A. Moss (Huddersfield). **Breeders Catfish, Loach and A.O.V. Egg-layers:** Mr. and Mrs. Cutting (South Shields). **Guppies:** 1, E. Kirk and Sons (Cleethorpes); 2, J. Peterson (South Shields); 3, Mr. and Mrs. Ruffell (South Shields). **Platies:** 1, H. Hubbard (Peterlee); 2, G. Kaye (Top Ten); 3, D. Povey (Blackborough). **Swordtails:** 1, G. Banch (Hull); 2, T. Douglas (Hull); 3, F. Kirk and Sons (Cleethorpes). **Mollies:** 1, J. Igoe (Sherwood); 2, J. S. Hall (Aireborough); 3, L. S. Hunter (York). **A.V. Female Livebearer:** 1, G. Thickbroom (Welbeck); 2, Mr. and Mrs. Kilvington (Doncaster); 3, E. Kirk and Sons (Cleethorpes). **A.O.V. Livebearer:** 1, Mr. and Mrs. Toynne (Sheffield); 2, Mrs. A. Hyslop (Swillington); 3, A. Moss (Huddersfield). **Siamese Fighters:** 1 and 3, Mr. and Mrs. Cohen (CAS); 2, Mr. Gillespie (Welbeck). **A.O.V. Anabantid:** 1, Mr. and Mrs. Cohen (CAS); 2, A. E. Heap (Blackborough); 3, J. Jones (Grantham). **Dwarf Cichlids:** 1, Mr. and Mrs. Hyslop (Swillington); 2, J. S. Hall (Aireborough); 3, P. Baker (Welbeck). **Angels:** 1, E. Kirk and Sons (Cleethorpes); 2, Mr. and Mrs. Toynne (Sheffield); 3, Mr. and Mrs. Blades (Cresswell). **A.O.V. Cichlids:** 1, Mr. and Mrs. Gilding (Gainsborough); 2, H. Hubbard (Peterlee); 3, D. and R. Standen (Loyne). **Small Barbs:** 1, Mr. and Mrs. Cohen (CAS); 2, Mr. and Mrs. Waring (Lyrham); 3, Mr. and Mrs. Dickinson (CAS). **A.O.V. Barbs:** 1, Mr. Gillespie (Welbeck);

2, Mr. and Mrs. Cohen (CAS); 3, J. Igoe (Sherwood). **Small Characins:** 1, J. Cartwright (Huddersfield); 2, Mr. and Mrs. Blades (Cresswell); 3, J. Wright (Alfreton). **A.O.V. Characin:** 1, D. and R. Standen (Loyne); 2, B. B. Booker (Morecambe); 3, T. Smith (Sheffield). **Tooth-carp:** 1 and 3, Mr. and Mrs. Blades (Cresswell); 2, Mr. Sonley (Independent). **Flying Fox and Sharks:** 1, K. Phillips (Blackpool); 2, R. S. Thompson (Hendon); 3, T. Smith (Sheffield). **Harporas Banios, Minnows:** 1, Mr. Gillespie (Welbeck); 2, Mr. and Mrs. Gilding (Gainsborough); 3, Mr. and Mrs. Dickinson (CAS). **Corydoras and Bronchias:** 1, J. Mosely (Keighley); 2, Mr. and Mrs. Clarke (Independent); 3, Mr. Edwards (Welbeck). **A.O.V. Catfish:** 1, J. S. Hall (Aireborough); 2, Mr. and Mrs. Kilvington (Doncaster); 3, Mr. P. Baxter (Swillington). **Loaches:** 1, V. Wright (Alfreton); 2, W. Worrall (Peterlee); 3, B. and B. Booker (Morecambe). **A.V. Female (Egg-layer):** 1, Mrs. Igoe (Sherwood); 2, Mr. and Mrs. Hyslop (Swillington); 3, Mr. Gillespie (Welbeck). **A.O.V. (Egg-layer):** 1, A. Bebbington (Peterlee); 2, G. Thickbroom (Welbeck); 3, B. Booker (Morecambe). **Pairs (Livebearer):** 1, Mr. and Mrs. Toynne (Sheffield); 2, J. and M. Bower (Sherwood); 3, H. Hubbard (Peterlee). **Pairs (Egg-layer):** 1, Mr. Sonley (Independent); 2, Mrs. Kirk (Cleethorpes); 3, A. Bebbington (Peterlee). **Common (Goldfish):** 1 and 3, S. Hall (Aireborough); 2, Mr. and Mrs. B. Foster (Cresswell). **Fancy (Goldfish):** 1 and 3, S. Hall (Aireborough); 2, C. H. Whitsey (Accrington). **A.O.V. (Coldwater):** 1, L. P. Grantham (Loyne); 2 and 3, S. Hall (Aireborough). **Shubunkins:** 1 and 3, C. H. Whitsey (Accrington); 2, S. Walsh (Accrington). **A.V. (Aurine):** 1, J. Igoe (Sherwood); 2, P. Martin (Alfreton); 3, Mr. Silk (Independent). **Mini Jars:** 1 and 2, Mr. and Mrs. Jackson (Workshop); 3, M. Wild (Accrington). **Best-in-Show:** A. D. Bebbington (Peterlee).

THE Welwyn Garden City A.S. were visited by Mr. Alan Tufts on the first Monday in February. He gave an interesting talk on "Livebearers", and brought along a variety of fish to illustrate his talk, and discussed in detail some of the breeding habits of "Blue Limia". The table show was won by D. Fitts with "Sunset Platy".

On the third Monday in February, Brian Hancock gave a comprehensive talk on "Electricity and the Aquarist". He covered the subject in a way which interested both novice and experts on electricity. The table show was won by Roger Noble with a "Kuhli Loach", and D. Fitts with a pair of "Thick Lipped Gouramis".

The society has enrolled thirty members during its first two meetings of this year, and looks forward to increasing its membership further. They meet at "The Scout Hut", Great Dell, W.G.C., on the first and third Mondays of each month, at 8.00 p.m. and welcome both experienced and novice aquarists alike. The secretary is Mr. Barry Stephens, 34, Moors Walk, Welwyn Garden City, (W.G.C. 27673).

AWARDS gained by members during last year were presented by the President, Mr. H. Berger, at the February meeting of the Iford and District Aquarists' and Pondkeepers' Society.

Following Mr. Berger's remarks on the various achievements of the past year a very interesting programme on the theme "Judging Techniques" was given by Mr. M. Brill and Mr. D. Seaman. This was coupled with a Table Show for two popular groups of tropical fish, Barbs and Mollies, which served to illustrate the points made during their talk. Members were invited to take part in judging the entries and their markings were afterwards compared.

Anyone interested in fishkeeping, tropical or coldwater, will be welcome to come along to meetings of the Society at the Fullwell Cross Library and details are available from the Hon. Secretary, Mr. Ron Ruth, 103 Heath Road, Chadwell Heath, Romford.

THE Wisbech and District A.S. has recently been formed. They hold their meetings every second and fourth Wednesday of the month at the Trinity Community Centre, Wisbech.

The discussions are given by experts in their specialised field of fishkeeping and are given so that every member can enjoy the hobby fully, which covers Marine, Freshwater, Tropical and Coldwater fishkeeping. The secretary is Mrs. P. Hooks, 47 Sefton Avenue, Wisbech, PE13 3QW.

DETAILS of the new class, to be introduced for the first time at this year's International Open Show of the **Fancy Guppy Association**, and to decide the F.G.A. World Guppy Champion 1973, together with entry forms for this class and show schedules are now available by sending a S.A.E. to the Association Show Secretary, Mr. D. R. Beacham, 17 Pedmore Close, Woodrow South, Redditch, Worcs.

Basically, each entry will consist of 5 matched males and 5 matched females (all from the same strain) which will be judged in two 6 inch by 4 inch by 4 inch tanks, all males in one tank and all females in the other tank. The entries will be judged to F.G.A. standards by at least one 'A' class, non-competing, F.G.A. judge. Entries for this one class must be notified to the Show Secretary, on the proper form supplied from him upon request, at least one month prior to the date of the show. This is in order that the correct number of tanks can be ascertained.

The date of the show is Saturday and Sunday, 26th and 27th May, and will be held at the Glebe Farm Community Centre, Glebe Farm Road, Stechford, Birmingham.

THE Wrexham T.F.S. meetings this month included a talk by Mr. E. Jones on Electricity in the Aquarium, with many interesting features, which helped members with their problems. A talk on the Breeding of Killifish was given by Mr. C. Pritchard and it was illustrated by slides. The winners of the fish shows to start the season were: **Corydoras Catfish:** 1, A. Stevenson; 2, Miss V. Jones; 3, E. Jones. **Characins:** 1, T. Pound; 2 and 3, Miss V. Jones. **Fish diseases** was the subject of a talk by M. D'Arcy during which a number of questions were put to him. A quiz was held and it was well won by R. Mathers. Meetings are held the second and last Thursday each month at the Fellowship Hall, Bradley Road, Wrexham.

THE new chairman of the Thurrock A.S. is Mr. E. Nicholl. Table show results were as follows: **Class G:** 1 and 3, D. Berry; 2, R. Wall. **Class H:** 1, 2 and 3, J. London; 4, D. Livermore. The secretary is Mr. J. Furber, 17 Capel Close, Stanford Le Hope, Essex.

AT the February meeting at the **Leytonstone A.S.** there was a table show of 4 by 4 furnished

bars. The first three places were filled by Mrs. Geraldine Summers, and fourth was Mr. S. Stone. Forthcoming table shows for the Essex & North East London Area Group are as follows: 18th April Harlow; 17 May Enfield; 7th June Leytonstone; 19th September Walthamstow; 17th October Tottenham; 13th November Bethnal Green. All classes can be obtained for these shows from your own club. The Leytonstone club welcomes all new members. The meetings are held every Thursday at the Baptist Church, Harrow Road, Leytonstone, at 8.00 p.m.

THE Annual General Meeting of the Bishops Cleeve A.S. was held in January and committee members still hold the same posts with the addition of one new committee member. The Secretary is A. K. Viner, 10 Epsay Roads Lower Tuffley, Gloucester. Mr. T. Collier gave an excellent talk on Angels their habits and breeding procedure which the members thoroughly enjoyed for the February meeting. The table show was for sexed pairs the results being: 1 and 4, J. Hawkins; 2, C. Fletcher; 3, A. Hoels.

AT the February meeting of the G.K.N. Pond and A.S., there was a talk on all aspects of preparing and showing fish by Mr. F. Matthews which was well received. The table show then followed, the results of which were: Catfish: 1, W. Bird; 2 and 3, T. Saunders; A.O.V.: 1, T. Saunders; 2, D. Rickhans; 3, D. Penwright. This is the last of the winter table shows and the winners of this will be announced at the next club meeting. The night ended with a general discussion surrounding the fishes benched.

ELECTION of officers for Loughborough and District A.S. resulted as follows: President: D. Slack; Chairman: T. Parry; Secretary: D. Kesley; Show Secretary: I. Purdy; Show Manager: D. Lindsay; Librarian: D. Tyler; P.R.O.: S. Purdy; Newsletter Editor: B. Hancock; Committee Members: B. Street, G. Taylor M. Kirkby.

AT the twenty first annual general meeting of the Portsmouth A.S. (F.B.A.S.) the following were elected to serve for the year 1973-74. Chairman: Mr. J. Lamboll; Secretary: Mrs. J. Stillwell; 34, Salcombe Avenue, Copner, Portsmouth; Treasurer: Mr. A. Furnedged and Show Secretary: Mr. J. Stillwell. It was reported that the new Community Centre was due to be completed at the end of July beginning of August and this had necessitated moving the Open Show to St. Patrick's Hall, Winter Road, Southsea this year in order to keep to the usual dates. It had been decided to add a further class for Aquascapes making 48 classes in all. Benching will be on 4th August, and it will be open to the public on the 6th to 11th.

The usual spring bank holiday inter-club competition will be held on Sunday 27th May at the usual venue.

The following received trophies won at table shows during the year: F. Willis: Tropical Breeders, Best Plant and Highest total points; W. Evans: Coldwater Breeders and Twintails; J. Lamboll: A.O.S. Coldwater fish; Mrs. J. Stillwell: Best Labyrinth; D. Stokes: Best

Shubunkin; J. Stillwell: Home Furnished Aquaria Tropical; Miss W. Ryder: Home Furnished Aquaria Coldwater; Miss J. Lamboll: Best junior entry Tropical; Master R. Bryant: Best junior entry Coldwater.

OWING to the absence due to illness of Mr. R. E. H. Moulder, the chairman, at the February meeting of the Gloucester Fishkeeping and Social Club was T. Collier. Instead of a guest speaker at this meeting, a 'Bring and Buy' sale in aid of club funds was held. In order to encourage lady and junior members to take active part in club meetings a show was held of novelty decorative jars. This was very well supported and some very imaginative scenes were on show. The judge was Tony Arvan, and he said the standard was very high and the amount of time spent on some of the exhibits must have been considerable. Mrs. Edith Adams was very pleased with the result, as the judge awarded her jars first, third and fourth places. Master David Merrett was placed second. In the tropical fish table show which was for egglayers the winners were first and fourth, C. Dyke, second being D. Merrett and third T. Collier.

RESULTS of the recent table show of the Stockton A.S. were as follows: Mollies: 1, R. Walker; 2 and 4, D. Keidby; 3, Q. Watt. Scavengers: 1, K. Greenley; 2, R. Alder; 3, Q. Watt; 4, A. Saunders.

THE Thurrock A.S. held its second meeting this year at the end of February. The subject was a "fish forum". A panel of senior fishkeepers answered questions from the floor. Consisting of: E. Nicols (Chairman), K. Appleyard (Panel Chairman); R. Nicholls, P. O'Brien and J. Harton answered questions from the floor. Table show: Class B: 1, K. Sparkling; 2, F. Turner; 3, R. Wall.

THE February meeting of the Weymouth A.S. was attended by thirty seven members. The chairman Mr. D. Rogers gave an interesting talk on general fish tank maintenance and fish diseases, which was well received by all the members. The monthly table show on furnished aquaria and aquascape was won by: Aquascape: D. Hullen; Furnished aquaria: Mrs. Brooke and Mrs. Mansel; 2, E. Warbridge; 3, P. Stimpson. Meetings are held at 7.30 p.m. at The Waverley Arms Hotel, Abbotshbury Road, Weymouth and new members and visitors will be most welcome.

ONE of the meetings of the Severn Side Ichthyological Society proved very profitable as a bring and buy sale resulting in a sum of £10.00 being handed for the society funds. At the other meeting in February there was a crossword quiz conducted by Mr. M. Price. The rest of the evening was taken up by a twenty questions quiz compiled by Mr. L. Brian. The society has now arranged a full programme of events for the coming meetings, and everyone is most welcome to come along. Meetings are held at the Labour Club, Abbey Foregate, Shrewsbury, at 8.00 p.m. on alternate Fridays (April 13th-27th).

MEMBERS at the February meeting of the New Forest A.S. (affiliated F.B.A.S.) were entertained by Mr. Jack Jeffery who had devised an intriguing crossword puzzle for the occasion. The monthly table show for this meeting was AOV Tropical and AV Rasbora and White Cloud Mountain Minnow. A. Williamson took the first three places in both sections, with fourth places awarded to R. Pearce and D. Harding. Visitors are always welcome to attend and anyone interested should contact Mr. R. Travers of 6 Auckland Avenue, Brockenhurst.

AT the February meeting of the Accrington and District A.S. the secretary C. Whitsey gave a talk on Marine Tropical Fish. This was followed by the usual table show the results being as follows: A.V. Tropicals: Master D. R. Johnson 1 (Juniors), 1, D. Carelar (Pairs), M. Wild (Cichlid), best on show.

A SLIDE show on Marines was given to Bracknell A.S. at their February meeting. The slides were hired from a firm in Leeds and were followed by some personal slides of Guernsey and Kers Gardens. At the second meeting a very informative talk on water pollution was given by Mr. Morley of the Thames Conservancy. The table show results were: Seniors: 1 and 2, L. Little; Senior AOV: 1, L. Little; Novices 1, D. Jeffrey; 2, M. Morgan; 3, L. Morgan.

NEARLY thirty aquarists attended the February meeting of the Stevenage A.S. and heard a very interesting talk on Fish Houses which was given by Mr. Tuffin. The next meeting will be held at Bodwell Community Centre at 8.00 p.m. on the 4th April.

27th MAY Mid-Sussex A.S. Annual Fish Exhibition at the Park Centre, Burgess Hill, Sussex. This non-competitive event is staged by M.S.A.S. members to show the complete range of fish and animals kept by the serious hobbyist. Introducing for the first time the Crab Derby in which a select band of shore crabs will compete for the Riband of the Rock Pools.

OFFICERS of the Mid-Herts A.S. are now as follows: President: T. Timms; Chairman: D. Larder; Show Secretary: A. Lusby; Secretary: R. Gracie, 160 Keells Road, Welwyn Garden City; Treasurer: B. Rummy. The date of our Open Show is 15th September.

THE results of the table show at the February meeting of Keighley A.S. were: Fish of the Month (Pairs): 1, D. Bowers; 2, D. Mosley; 3, D. Ibbotson. AOV: 1, S. Gear; 2, Mast. P. Barton; 3, D. Bowers. November AOV: 1, B. Lydon; 2, Mrs. Taylor; 3, D. Mosley. Junior AV: 1, Master Jones; 2, Master Barton; 3, Master Hollingsworth.

FOR their February meeting Llantwit Major A.S. (F.B.A.S. and G.N.A.A.) entertained Rhondda A.S. with an Interclub contest, results as follows: L.M.A.S. winners by 780 points to 771 points. Egglayers Class: 1 and Best Fish, W. Limbrick (L.M.); 2, Master K. Williams (R); 3, J. Edwards (L.M.); 4, J. Pisk (R). Livebearers Class: 1 and 2, A. Ibbotson (L.M.); 3, G. Harry (R); 4, A. Pickett (R). Llantwit Major members wish to thank Rhondda A.S. and Judges W. Gowerell and D. Warrneant for their support in spite of the very poor weather conditions.

AN address on importing and breeding fish was given by Mr. P. Robinson of Bradford at the Privateers A.S. February meeting. This was a very informative talk and was enjoyed by a reasonably good attendance.

The fourth Inter-Society Show was a great success. The judge for the table show was P. Moorhouse of Huddersfield and there were 84 entries. The Best in Show was won by D. Greenwood of Nelson.

Livebearers: 1, A. & C. Collinson (Aireborough); 2, Mr. Dunn (Horsforth); 3, G. Ibbotson (Keighley). Barbs: 1, R. Whisaker (Privateers); 2 and 3, A. & C. Collinson (Aireborough). Characins: 1, A. & C. Collinson (Aireborough); 2, R. Stamford (Bradford). Cichlids: 1, J. A. Whiteley (Aireborough); 2 and 3, G. Poole (Mixerden). Anabantids: 1, J. A. Whiteley (Aireborough); 2, B. Turner

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(Mixed); 3, G. Ibbison (Keighley). Catfish and Loach: 1, D. Greenwood (Nelson—B.I.S.); 2, A. & C. Collins (Aireborough); 3, Mr. Hodgson (Mixed). Carps and Minnows: 1, D. Greenwood (Nelson). Sharks and Foxes: 1, R. Whitaker (Privaterr); 2, Mr. Hall (Privaterr); 3, Mr. Hodgson (Mixed). Toothpicks: 1, J. A. Whiteley (Aireborough); A.O.V.: 1, J. S. Hall (Aireborough); A.V. Breeders: 1 and 2, B. Tate (Nelson); 3, G. Ibbison (Keighley). A.V. Pairs: J. A. Whiteley (Aireborough); 2, D. Greenwood (Nelson); 3, Mr. Bowers (Keighley). Coldwater: 1, 2 and 3, J. S. Hall (Aireborough).

AT the February meeting of the **Taunton and District A.S.** Mr. A. Cavill gave a talk on "Fish House Construction". The table-show results were: Barbs (under 3 inches): 1 and 2, H. Clemas; 3, D. Barnshaw. Barbs (over 3 inches): 1, 2 and 3, B. Barnshaw. Catfish and Loaches: 1, S. L. Peary; 2 and 3, M. Weddell. Danios: 1 and 2, P. A. James; 3, Miss S. C. Culverwell. Rasboras: 1 and 2, E. Barnshaw; 3, M. Weddell. Labros: 1, S. L. Peary; 2, M. Weddell.

The Aggregate Cup for 1972 was won by Mr. D. S. Ayres and the Barb Bowl by Mr. E. Barnshaw.

OFFICERS for the **Aireborough and District A.S.** this year are: President: A. D. Lawson; Vice President: J. V. Hall; Secretary: E. C. Ackroyd (Rawdon 5994); Treasurer: P. Iveson; Show Secretary: B. Megson; Ordinary Committee Members: S. Hall; G. Flether; M. Watson; D. Lawson.

AT the Annual General Meeting of **Southampton A.S.** in February, the following Officers and Committee were elected: Chairman: D. V. Jones; Vice-Chairman: R. Block; Secretary: A. J. Lines; Treasurer: N. Meaker; Show Secretary: T. Newbury; Committee: Messrs. P. Brown, R. Dumont, N. Jennings and R. Smith.

THE following officers have been elected for the committee of the **Castleford A.S.**: Chairman: R. Baker; Vice-Chairman: J. Furnall; Secretary: Mrs. J. E. Asquith; Treasurer: Mrs. Z. Barrett; Show Organizer: Mr. G. Thickbroom; Publicity Officer: Mrs. R. Baker.

THE new committee of the **Huddersfield T.F.S.** is as follows: Chairman: N. R. Gibson; Vice Chairman and Treasurer: T. Beok; Secretary: C. Woolough, 1087 Manchester Road, Linthwaite, Huddersfield; Show Secretary: M. Jessop, 18 Ryedale, Kirkstall, Huddersfield; Magazine Editor: Mrs. T. Walker; Catering Officer: Mrs. S. Gibson; Committee: D. Hough, S. Brilly; Junior Member: Miss S. Robinson.

THE **Brighton & Southern A.S.** held a table show for Labyrinth and Characin at their February meeting judged by Mr. A. Blake, F.B.A.S. The results were as follows: Characin: 1, Mrs. J. Dawes; 2, V. Aldis; 3, H. Maddison; 4, Mr. and Mrs. C. Corbin. Labyrinth: 1, D. Steer; 2, D. Vaughan; 3, V. Aldis; 4, H. Maddison.

While judging was going on the members were given a talk on loaches and botias by Mr. J. Burtles.

THE speaker at the February meeting of the **Bristol T.F.C.** was Mr. G. Churchill who gave a very interesting and enlightening talk on Furnished Aquaria. This was illustrated with coloured slides. Plans are in hand for a social evening on 5th May at the British Railway Social Club, Temple Meads, Bristol, when all members and friends will be welcome.

THE Fancy Guppy Association, Birmingham section, points cup trophy, March 1972-February 1973. First ten positions only: 1, 2 and 3, receiving cups: 1, G. Steadman (Kingswinford); 2, M. H. Delingpole (Aberchurch); 3, G. Fletcher (Palsall, Nr. Walsall); 4, A. C. J. Truman (Bristol); 5, D. O'Brien (Bristol); 6, W. J. Ewart (Leamington); 7, D. Steadman (Kingswinford); 8, B. Beachman (Birmingham); 9, T. Smith (Birmingham); 10, E. Morgan (Birmingham). At last month's meeting Mrs. J. Croft of Wombourne, Staffs., gained best male honours with a Looped Tall Exhibit. Best breeder, best female and best in show was taken by W. Ewart, Walsall. D. Leary of London gained a Gold Pin for advanced master breeder. The association meet on the fourth Sunday afternoon of each month at Glebe Farm Community Centre, Stechford, Birmingham. New members are always welcome.

THE British Marine Aquarist Association (West Midland Group) monthly meeting began with the table show results being as follows: 1, E. Hudgera; 2, R. Edwards; 3, H. Tonks. The chairman D. Highfield gave a rundown on the set-up he has started and said it was going on very good with plants flourishing. There were hopes of a day out soon with a chance to get some very fine native marines. The night ended with a talk on how long dealers should keep marines before they go on sale as most of the fish are in shock for some time.

THERE was a good attendance and some lively discussion at the Annual General Meeting of the **Trowbridge and District A.S.** and P.S. During the year the chairman and one of the founder members, D. Hayter retired owing to other commitments. The club would like to express their thanks for all his hard work. W. Burton was re-elected as chairman and the new committee is as follows: Secretary: Mrs. S. Scudamore, 45 Trowbridge Road, Bradford on Avon, Wilts; Treasurer: Mrs. P. Huntley; Show Secretary: Mrs. J. Burton, 17 Palebarn Road, Trowbridge; News Letter Editor: S. Huntley; Committee Members: M. Samuels, C. Cass, G. Castle, M. Patrick and R. Cottrell. Visitors and new members are welcome to meetings held on the second Tuesday of each month at the Bradford on Avon Rowing Club.

RESULTS of the second leg between **Alfreton A.S.** and **Hucknall and Bulwell A.S.** were as follows: Swords and Mollies: 1 and 2, Mr. Mighall; 3, Mr. Simpson. Minnows, Danios and Rasboras: 1 and 2, M. Footitt; 3, S. Dooley. Large Characin: 1, S. Hill; 2, J. Wright; 3, Mr. Mighall. Cichlids (Small): 1, Mr. Freeman; 2, Mr. Mighall; 3, Mr. Buck. Barbs (Small): 1 and 3, J. Wright; 2, S. Hill. Catfish and Loaches: 1, Mrs. V. Wright; 2, Mr. Mighall; 3, Mr. Wood. Best in Show was a Cichlid owned by Mr. Freeman of Hucknall and Bulwell. Points for the first two legs held in 1972 were Hucknall and Bulwell 30 points and Alfreton and District 38 points—an overall win for Alfreton A.S. who are looking forward to meeting Hucknall later this year.

RESULTS of the February show of the **Dudley and District A.S.** were as follows: Class D: 1, 2 and 3; J. Goodman; 4, J. Millard. Class D Novice: 1, R. Shakespeare; 2, Mrs. R. Hickman; 3, C. James; 4, D. Price. Class E: 1 and 3, W. Hickman; 2, S. Cartwright; 4, J. Goodman. Class E Novice: 1, R. Mason; 2, Mrs. R. Hickman; 3 and 4, D. James. Best fish in show W. Hickman. The judge was Mr. F. Matthews, F.B.A.S., Gornal.

RESULTS of the **Rotherham and District A.S.** Fourth Open Show, which recorded 880 entries, were as follows: Section A—Platies: 1, H and M. Buxton (Sheffield); 2, Mr. and Mrs. Blades (Creswell); 3, P. A. Moye (Bletchley). Mollies: 1, P. Baker (Welbeck) Section Winner; 2, Mr. and Mrs. Tomlinson (Chesterfield); 3, Susan Clark (Aireborough). Swordtails: 1, Susan Clark (Aireborough); 2, P. J. Whelan (Accrington); 3, C. Beckenham (Oldham).

Guppies: 1 and 2, E. Kirk & Sons (Grimsby); 3, L. Leadbetter (Flewood). A.O.V. Livebearer: 1 and 3, P. Stanforth (Don Valley); 2, J. S. Hall (Aireborough). Section B—Small Barbs: 1, Mr. and Mrs. Wells (Doncaster); 2, Mr. and Mrs. Gullane (Buxton); 3, M. Richardson (York). Large Barbs: 1, Mr. and Mrs. Cohen (Pontefract) Section Winner; 2, R. Jones (Welbeck); 3, D. Sewell (Sherwood). Section C—Small Characin: 1, M. and D. Laycock (Sheffield); 2, Mr. and Mrs. Harris (Gainsborough); 3, G. Gillespie (Castleford). Large Characin: 1, Mr. and Mrs. Stanton (Sheffield) Section Winner; 2, Mr. Thickbroom (Castleford); 3, S. Clark (Aireborough). Section D—A.V. Toothpick: 1, N. Carr (Doncaster) Section Winner; 2, Mr. and Mrs. Smith (Sheffield); 3, J. Walker (Rotherham). Section E—Sharks and Foxes: 1, Mr. Thickbroom (Castleford) Section Winner; 2, T. Smith (Sheffield); 3, Mr. and Mrs. Clarke (Aireborough). Corydoras: 1, P. Baker (Welbeck); 2 and 3, P. A. Moye (Bletchley). A.O.V. Catfish: 1, Mr. and Mrs. Kivington (Doncaster); 2, C. Pratt (Bedworth); 3, T. Rodgers (Rotherham). Loaches: 1, H. Marshalls (Oldham); 2, Mrs. Walker (Creswell); 3, G. Beckenham (Oldham). Section F—Rasboras, Danios, Minnows: 1, Mr. and Mrs. Wells (Doncaster) Section Winner; 2, A. Moss (Huddersfield); 3, T. Smith (Sheffield). Section G—Dwarf Cichlids: 1 and 3, L. Leadbetter (Flewood) Section Winner; 2, P. A. Moye (Bletchley). Large Cichlids: 1, B. Sleight (Rotherham); 2, J. Furness (Castleford); 3, D. I. Whiteside (Blackpool). Angels: 1, E. Kirk and Sons (Grimsby); 2, Mrs. Harrison (Rotherham); 3, Mr. and Mrs. P. Bull (Creswell). Section H—Fighters: 1, Mr. Marrow (Worksop); 2, Mr. and Mrs. Norton (Grimsby); 3, G. Gillespie (Castleford). A.O.V. Anabantid: 1, Mr. and Mrs. F. Buxton (Aireborough) Section Winner; 2, Mr. and Mrs. Cohen (Pontefract); 3, J. Salisbury (Bedworth). Section I—A.O.V. Tropical: 1, Mr. Thickbroom (Castleford) Section Winner; 2, Mrs. A. Barratt (Castleford); 3, H. Marshalls (Oldham). Section K—Breeders (Livebearers): 1, T. Douglas (Hull) Section Winner; 2, A. Bellamy (N/S); 3, G. Andrews (Hull). Breeders (Egglayers): 1, Mr. and Mrs. P. Buxton (Aireborough); 2, Mr. and Mrs. Gabe (Chesterfield); 3, D. I. Whiteside (Blackpool). Section L—Pairs (Livebearers): 1, C. Goodman (Oldham) Section Winner; 2, J. Igoe (Sherwood); 3, J. Tait (Blakeborough). Pairs (Nightgowns): 1, Mr. and Mrs. Arrand (Gainsborough); 2, D. Foster (Don Valley); 3, Mr. and Mrs. Harris (Gainsborough). Section M—Goldfish and Comets: 1, 2 and 3, J. S. Hall (Aireborough). Shubunkins: 1 and 2, J. S. Hall (Aireborough); 3, Mr. Eddington (Rotherham). Fancy Goldfish: 1, 2 and 3: J. S. Hall (Aireborough) Section Winner. A.O.V. Goldwater: 1 and 2, J. S. Hall (Aireborough); 3, Master G. Pratt (Bedworth). Section N—Mini-Jars: 1, J. Robertson (Mount Pleasant); 2, R. Harlow (Derby Regent); 3, Mr. and Mrs. Gabe (Chesterfield). Plants: 1 and 2, Mr. Kivington (Doncaster) Section Winner. Best Fish in Show: Angel owned by E. Kirk & Sons (Grimsby A.S.).

THE regular third Monday of the month meeting of **Newbury and District A.S.** was held in February when they were pleased to welcome Becknell A.S. for a 12-a-side plus breeders team match, judged by Adrian Blake. Becknell took first and second in the 12-a-side section but unfortunately omitted to bring a breeders team leading Newbury rather fortunate winners, by 11 points to 7. It is hoped that another match will be arranged shortly.

DISINFECT NEW PLANTS AND FISH WITH  **Hillside Aquatics London N12**

IN February an excellent meeting of the Rhonda A.S. was held and the occasion was an Inter-Club match, the opponents being Swansea. At the same meeting a lecture was given by Mel Endicott of the Killie Association. The Inter-Club resulted in a resounding win by Swansea and the result was a shock for Rhonda especially as Swansea are only the second club to beat Rhonda for a long period. There were 80 members present.

TWENTY members of the Brentwood A.S. attended the February meeting of the Chelmsford A.S. last week. The highlight of the evening was a quiz which was won by Brentwood by 33 pts. to 27 pts.

The table show winners were: Characins: 1, K. Quamby; 2, L. Dwight; 3 and 4, D. Green, all Brentwood members. In the sword class: 1, P. White (Brentwood); 2 and 3, D. Bannerman (Chelmsford); 4, G. Sutton (Chelmsford).

A REPORT from Uxbridge & District A.S. states that the first two inter club matches this year were against Amersham and High Wycombe. Amersham were beaten and the contest with High Wycombe was lost. Both events were thoroughly enjoyed and it is intended to have return competitions later this year. Other club events have included a lecture on fish photography, an excellent illustrated talk on Discus and their breeding habits by Roy Skipper, and Alan Tufts on livebearers. The first table show of the year attracted 23 entries. These were judged by T. Cruickshank.

IN February the Lincoln and District A.S. held an Inter-Club show with Grantham A.S. Mr. W. D. Gidding of the Grantham A.S. was the judge and the results were as follows: Livebearers: 1 and 2, Mr. Jones (Grantham); 3, Master Borrill (Lincoln). Cichlids: 1, Mr. and Mrs. Shipman (Grantham); 2, Mr. and Mrs. Sellars (Lincoln); 3, Mr. Kuhn (Lincoln). Characins: 1, Mr. Patterson (Grantham); 2, Mr. Goldson (Lincoln); 3, Mrs. Woodliffe (Lincoln). A.O.V.: 1, Mr. Patterson (Grantham); 2, Mr. and Mrs. Sellars (Lincoln); 3, Mrs. Rawding (Lincoln). Best in Show: Mr. and Mrs. Shipman (Grantham).

OFFICERS elected at the Harlow A.S. Annual Meeting were as follows: Chairman: R. Kerridge; Vice Chairman: P. Allen; Secretary: J. Duncan, 113 Little Pynches, Harlow, Essex; Treasurer: L. Hayes; Show Secretary: S. Jordan; P.R.O.: P. Hynes.

New members and visitors are welcomed to fortnightly meetings at Potter Street Community Association Centre at 8.00 p.m. on Wednesdays.

AT their first meeting in February the Brentwood A.S. spent a most enjoyable evening as guests of the Chelmsford A.S. The evening began with a quiz between the two clubs which Brentwood managed to win by a narrow margin. The rest of the evening was spent in a general discussion among the members of both clubs. For the second meeting in the month the club had a visit from W. Rowe of Ilford A.S. Mr. Rowe gave a most interesting lecture on Fish Behaviour. The lecture covered a wide range of aspects on this subject and although the greater part of the examples were of coldwater fishes the evening was enjoyed by all present.

THE results of the Kidderminster and District A.S. table show were as follows: Cichlids: 1, P. Allen; 2, G. Lawrence; 3, W. Nixon. Anabantids: 1, J. Barfoot; 2, W. Nixon; 3, Mr. and Mrs. P. Mullane. Rainbow: 1, G. Lawrence; 2, P. Allen; 3, Mr. and Mrs. P. Mullane. Best fish in Show: P. Allen.

PLANS for the forthcoming combined Open Show were discussed at the February meeting of SPASS and also the final arrangement for the invitation show to be held on Saturday 5th May. An impromptu talk was given by Mr. D. Crisp on the problems facing an enthusiast entering his first Open Show. The next meeting is arranged for Tuesday, 17th April, when the table show will be for Single-tails and it is hoped to have a lecture on filtration.

THE February meeting of the Bristol A.S. was very well attended and two of the younger members took the chair as question masters. Some of the questions even had the experts thinking deeply. The annual show is to be held on the 14th and 15th September and will be the usual Open Show. All enquiries to: E. N. Bowden, 12 Stoneleigh Walk, Knowle, Bristol, BS4 2RL.

OBITUARY

WE regret to report the death of Des Hailey on 4th March, the Vice-Chairman of the Rhonda Club. One of the most popular members of the Committee he will be sadly missed by all his fellow members and all who knew him.

He was a tremendous enthusiast, and visited all the Open Shows both in Wales and the West of England. He had been ill for many years but he was always cheerful and worked hard for the Club. It can be said of him that he worked hard, and enjoyed life although he was in poor health. He leaves a wife and young boy.

SECRETARY CHANGES

Priory A.S.: M. Collins, 210 Broadway, Colchester, North Shields, Northumberland. Witham and District A.S.—Show Secretary: T. T. Guest, 22 Giffins Close, Braintree, Essex.

VENUE CHANGE

Newcastle Guppy and Livebearer Society: Meetings now held on first and third Tuesday in each month at the Meadowfield Social Club, First Avenue, Heaton (off Chillingham Road), commencing at 8.30 p.m. prompt.

CHANGE OF SHOW DATES

Basingstoke and District A.S.: Open Show on the 30th June at the Carnival Hall, Basingstoke. Schedules from: R. Rich, 93 Pinkerton Road, Basingstoke, Hants.

Chelmsley A.S.: Open Show is to be held on Sunday 1st July and not as previously stated.

Blakebury A.S.: Date changed of Open Show from 28th of April to 29th. Show schedules and enquiries from Mr. B. J. Brown, 8 Garden Field, Wyke, Bradford, Yorks BD12 9NH.

CANCELLATION OF SHOW

Due to circumstances beyond their control the Dukeries A.S. has had to cancel its Open Show scheduled for the 6th of May.

AQUARIST CALENDAR

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

7th April: Yate and District A.S. Open Show. Details from R. A. Bennett, 22 Kents Green, Kingswood, Bristol.

7th April: G.S.G.B. Annual General Meeting, 2.30 p.m., Conway Hall, Red Lion Square, Holborn, London. Goldfish for Beginners, Part Two, R. Whittington. The Merits and Demerits of Handspawning. Panel. Table Classes. Refreshments available.

8th April: Scunthorpe Museum Society Aquarist Group Open Show. To be held at the T.A. Drill Hall, Cottagebeck Road, Scunthorpe, Lincs. Schedules available from A. Shucksmith, 3 Salmonby Road, Scunthorpe, Lincs.

8th April: Warrington A.S. Open Show. F.N.A.S. rules. St. Benedicts Y.C., Bell Hall, Orford Lane, Warrington. Show Secretary: J. Higham, 42 Hood Lane, Sankey, Warrington, Lancashire. Tel.: 36939.

8th April: Uxbridge and District A.S. Open Show at the G.P.O. Social Club, Willow Tree Lane, Yeading Lane, Hayes, Middlesex. Schedules will be available from show secretary, Mrs. S. Whitehead, 31 Berberis Walk, West Drayton, Middlesex.

14th April: Independent A.S. Open Show will be held at the Public Hall, Islington Town Hall, Upper Street, Islington, N.1. Schedules from B. Mason, 70 Myddleton Square, London, E.C.1. S.A.B. please.

14th April: Bath A.S. 25th Anniversary Open Show to be held at St. Peter's Hall, Dorset Street, Bath. Schedules available from the show secretary, Mrs. W. Short, 22 Caledonian Road, Bath, BA2 3RB. Tel: Bath 26028.

15th April: Coventry Pool and Aquarium Society Open Show, Foleshill Road (A.444), Coventry. Details from Show Secretary, S. Woodbridge, 32 Ridgeway Avenue, Stryedraie, Coventry, or Secretary, C. J. Grant, 28 Cecily Road, Chylesmore, Coventry.

15th April: Sheffield and District A.S. Open Show at Grassville College, Grassville Road, Sheffield 2 (nr. Midland Station). Schedules and show information available from show secretary, Mr. T. Smith, 176 Woodburn Road, Sheffield, 9.

15th April: Stockton-on-Tees A.S. Eighth Annual Open Show at St. Peter and Paul School, Durham Road, Stockton (adjacent to Mile House Hotel). Details and schedules from C. Buck, 22 Danby Grove, Thornaby, Teeside.

15th April: Stanley and Consett A.S. First Open Show, South Stanley Community Centre. Details from R. R. Elliott, 25 Berryhill Close, Beach Green, Winstan, Blaydon-on-Tyne. Tel: Blaydon 3416.

21st April: Runnymede A.S. Open Show. Show schedules from J. Garrad, Le Rivage, Long Lane, Stratwell, Staines, Middlesex; or 'phone: K. Smith, Ashford 59369.

22nd April: Hyde A.S. Easter Sunday Open Show. Venue to follow or telephone secretary, A. Darby—061-368 4868.

22nd April: York and District A.S. Open Show at The Folk Hall, New Earswick, York. Schedules available shortly from show secretary, P. Rees, 30 Don Avenue, Dringhouses, York.

22nd April: Hyde A.S. Annual Open Show at Hattersley Civic Centre, Hattersley Road East, Hattersley, Hyde.

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

23rd April: The Leicester Fishkeepers Club has its annual one-day exhibition on Easter Monday.

28th April: Trowbridge and District A.S. Eighth Annual Open Show at the Nelson Haden Boys School, Trowbridge. Schedules available from show secretary, Mrs. J. A. Burton, 17 Polebarn Road, Trowbridge, Wilt.

29th April: Ilfracombe and District A.S. Open Show, Holiday Inn, Ilfracombe. Show Secretary, C. Lipcomb, 8 Postbeare Road, Ilfracombe. Tel: 2615

29th April: Loynes A.S. Third Open Show, Priory Hall, China Street, Lancaster. Three large car parks. Show secretary, Mrs. H. Batchelor, 52 Lythefell Avenue, Halton-on-Lune, Lancaster. Tel: Halton-on-Lune 625.

halomid A TABLET A DAY, SENDS WHITE SPOT AWAY
Hillside Aquatics London N12

29th April: Blakeborough A.S. Open Show at the J. Blakeborough and Sons Ltd. canteen, Brighouse, Yorkshire. Further details later.

29th April: Medway A.S. Open Show. Note New Venue: Kent Alloys Ltd. Restaurant, Priory Road, Strood, Kent. Show Schedules: J. Marshall, 97 Dargats Road, Walderslade, Chatham, Kent.

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

6th May: Rushampton A.S. Open Show. Further details to follow. Any information, contact show secretary, Derek Lambourne, 7 Wheeler Court, Plough Road, SW11 2AX. Tel: 01-223 2630.

6th May: The M.A.A.S. Inner Society Show at Drayton Manor Park.

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

12th May: The Second Annual Open Show of the Gloucester Education and Leisure Centre, Palmwick Road. Schedules from the show secretary, Mike Brooks, 114 Melbourne Street, Gloucester, from February on.

13th May: Corby and District A.S. Open Show, at the Corby Civic Centre. F.A.B.A.S. Details and schedules from the show secretary, A. Shaw, 176 King Street, Kettering, Northants.

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

13th May: Croydon A.S. Open Show at Sir Phillip Games Recreation Centre, Moorland Avenue, Croydon, Surrey. Show schedules from A. Smith, 3 Hindhead Way, Wellington, Surrey.

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

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

19th May: Whiteway and District Fishkeepers Society First Open Show, Whiteway Community Centre, Kelston View, Whiteway, Bath. Schedules available from secretary, S. V. Daniels, 21 Haycombe Drive, Whiteway, Bath, BA2 1PG.

20th May: Yeovil and D.A.S. Open Show, the School Hall, Church Street, Martock, nr. Yeovil. Schedules from M. Hulbert, 62 Meadow Road, Yeovil, Somerset.

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

20th May: Merseyside A.S. Annual Open Show. The British Legion Club, Holyoke Hall, 2 Cranford Ave., Liverpool, L18 1EG.

20th May: Kettering A.S. Open Show at the St. John Ambulance Centre, Fuller Street, Kettering. All information and show schedules can be obtained from R. Vickers, 141 St. John's Road, Kettering, Northants.

26th-27th May: Tottenham & District A.C. Open Show at the Old Drill Hall, High Road, Tottenham, N.17. Schedules may be obtained from K. Nutt, 99 The Avenue, Tottenham, N.17.

27th May: The 1973 Fancy Guppy Association World International will be held at the Glebe Farm Community Centre, Stechford, Birmingham. Show schedules are available from the show secretary, D. R. Beacham, 17 Pedmore Close, Woodrow South, Redditch, Worcs. Open to the public at 3 p.m.

27th May: Weymouth A.S. Open Show will be held at The Small Sidney Hall, Weymouth. Show Secretary, A. Worth, 67 Queens Avenue, Dorchester, Dorset.

27th May: Boston A.S. Open Show, Blackfriars Theatre, Boston. Schedules from S. Noble, 175 Wood Farm Road, Boston, Lincs.

27th May: Middleton & District A.S. 2nd Open Show. Full details may be obtained from The Show Secretary, R. Forayth, 61 Sandy Lane, Middleton, Manchester (s.a.e. please).

2nd June: Bristol Aero Aquarist third Open Show, at Wesleyan Church Hall, Bryants Hill, St. George, Bristol, S. Enquiries to Show Secretary, G. Sprake, 134 Yew Tree Drive, Kingswood, Bristol, BS15 4UP.

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

3rd June: Accrington and District A.S. Open Show at St. John Ambulance Drill Hall, Bull Bridge, Accrington, Lancs. Schedules, etc., from S. Walsh, Show secretary, 133 Lammack Road, Blackburn, Lancs, BB1 5LA.

3rd June: Loughborough and District A.S. Open Show will be held at the Sports Centre, Granby Street, Loughborough. Show Secretary, I. Purdy, 10 Cleveland Road, Loughborough, Leicestershire, LE11 2SF.

3rd June: South Derbyshire and District A.S. Annual Show (Members), Good Companions Club, Church Gresley, nr. Burton-on-Trent. Show secretary, R. Brabbins, 42 West Mead Road, Barton, nr. Burton-on-Trent.

3rd June: Sudbury A.S. First Open Show, St. Andrews Church Hall, Harrow Road, Wembley, Middlesex. Schedules from L. Brazier, 66 Ormsby Way, Kenton, Middlesex.

3rd June: Priory A.S. Open Show. Details available later.

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

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

9th June: Havant and District A.S. Third Open Show at St. George's Hall, Waterlooville. Show secretary, V. B. Hunt, "Caeglas," 120 London Road, Widley, nr. Portsmouth, Hants.

10th June: Lincoln and District A.S. Show Secretary, H. Kuhn, 44 Scorer Street, Lincoln.

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

10th June: High Wycombe A.S. Open Show. The venue will be Lane End Village Hall, Lane End, High Wycombe, Bucks.

10th June: Bishop Auckland A.S. Fifth Annual Open Show to be held in the Y.M.C.A., Proudfoot Drive, Woodhouse Close Estate, Bishop Auckland. Details later.

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

17th June: Frelance A.S. Open Show, Amersham Community Centre, Thurlow Street, S.E.17. For details contact J. Stamp, 72 Redmond House, Lant Street, Borough, S.E.1.

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

17th June: Bishops Cleeve A.S. Open Show at the T.A. Centre, Arle Road, Cheltenham, Glou. Schedules from show secretary, Mrs. J. Hawkins, 44 Burton Street, Cheltenham, Glou.

17th June: Salisbury and District A.S. Open Show at the City Hall, Fisherton Street, Salisbury, Wilt.

17th June: Northwich & District A.S. 5th Open Show, Hartford Secondary Boys School, Chester Road, Hartford, Northwich. Details from Show Secretary: Mrs. D. J. Thorne, 28 Whitegate Road, Wimford, Cheshire. Tel: Wimford 3380.

17th June: Fancy Guppy Association (Lancaster Section) Open Show, Gregson Institute, Moor Lane, Lancaster. All particulars from Show Secretary, J. F. Peck, 5 Ridge Street, Bull, Lancaster.

23rd June: Dunmow and District A.S. Open Show at the Foskes Memorial Hall, Gt. Dunmow. For further details please contact show secretary, D. McMurdie, 37 Capel Road, Rayne, nr. Braintree.

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

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

24th June: Mount Pleasant A.S. third Annual Open Show. Details to follow.

24th June: Billingham A.S. 3rd Annual Open Show, at Billingham Community Centre, Billingham Town Centre. Schedules available mid-May from: J. Atwell, 34 Hatfield Place, Peterlee, Co. Durham. Tel: 4185; and A. Crossley, 32 Sledwick Road, Billingham.

24th June: South Shields A.S. welcomes all to open show. Details later.

24th June: Dudley & District A.S. first Open Show at the Blind Institute, Wolverhampton Road East, Sedgley. F.B.A.S. Show schedules available from Show Secretary, W. A. Hickman, 29 Ladbrock Grove, Lower Gornal, Dudley, DY3 2UP, Worcestershire.

30th June: Basingstoke and District A.S. Open Show at the Carnival Hall, Basingstoke. Schedules from R. Rich, 93 Pinkerton Road, Basingstoke, Hants.

1st July: Thorne A.S. Annual Open Show.

1st July: Exeter and District A.S. Open Show. Further details later.

1st July: Chelmsley A.S. Open Show. Schedules and further information from show secretary, Mr. J. Aidney, 4 Shenton Walk, Kinghurst, Birmingham.

7th July: G.S.G.B. Quarterly Meeting, 2.30 p.m. Conway Hall, Red Lion Square, Holborn, London. Goldfish for Beginners' Part Three. R. Whittington. A talk by our Technical Director, J. Bundell. Feeding the Young Goldfish. Panel. Table Classes. Refreshments available.

7th July: Borehamwood & D.A.S. First Annual Aquascope and Furnished Aquaria Festival. Further information and schedules from D. J. Crucifix, 64 Milton Drive, Borehamwood, Herts, WD6 2BB.

7th-8th July: Dagenham Town Open Show, Central Park, Dagenham. Show schedules from show secretary, D. G. Kent, 74 Lynwood Drive, Collier Row, Romford, Essex, RM5 2QT. Tel: Romford 67804.

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

8th July: Ashington, Blyth and District A.S. Second Annual Open Show. Details to follow.

14th-15th July: The Aquarist and Pondkeeper Fishkeeping Exhibition, Alexandra Palace, Wood Green, London, N.22.

15th July: The Sandgrounders' A.S. Third Annual Open Show. Full details later.

29th July: Oldham & District A.S. Annual Open Show, at Werneth Park, Oldham. Schedules (when available from Show Secretary: H. Birchwood, 30 Inverness Avenue, Blackley, Manchester, 9.

6th-11th August: The Portsmouth A.S. Annual Open Show at St. Patrick's Hall, Winter Road, Southsea, Portsmouth. Setting up day will be Saturday 4th August, judging on the 5th. Show schedules are obtainable from J. Stillwell, 34 Salcombe Avenue, Copnor, Portsmouth, Hants.

12th August: North Staffs. A.S.

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

18th-19th August: Harwich and District A.S. Annual Show to be held at The Queens Hotel, Dovercourt, High Street.

19th August: Huddersfield T.F.S. Annual Open Show. Details to follow.

19th August: Valley A.S. Open Show to be held at Civic Hall, Rarnbottom. Show secretary, M. Berry, 8 Leyland Street, Blackford Bridge, Bury, Lancs. Tel: 061-766 8574.

19th August: Stroud & District A.S. Open Show. Mid Gloucestershire Technical College,

Stratford Road, Stroud, as last year. Show Secretary: Mrs. D. Cole, The Hill, Randwick, Stroud.

26th August: Fleetwood A.S. First Show at The Fleetwood Grammar School, Poulton Road, Fleetwood.

2nd September: Lucas Pool and Aquarium Pool Society 3rd Open Show at same venue as last year: Spring Road, Birmingham. Schedules from: Show Secretary, K. Thomas, 11 Alston Road, Solihull, Warks.

8th September: Three Counties Group Annual Open Show. Show secretary, John Horsey, 4 Rickman Close, Woodley, Reading, Berks.

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

9th September: Newbury and District A.S. Open Show. Full details later.

9th September: Barnsley T.F.S. Ninth Annual Open Show at The Mapplewell, Staincross Village Hall.

9th September: One Day Open Show Harlow A.S., at Moot House, Harlow. Show Secretary: Steve Jordan, 48 Whitewains, Harlow, Essex.

9th September: Peterlee A.S. 11th Open Show. Schedules available later from Secretary, A. D. Bobbington, 40 Marlborough Road, Hastings Hill, Sunderland.

14th-15th September: Bristol A.S. Open Show. All enquiries to E. N. Bowden, 12 Stonclich Walk, Knowle, Bristol, BS4 2RL.

15th September: Weston-super-Mare and District T.F.S. Fourth Open Show at St. Johns Hall, Oxford Street, Weston-super-Mare. Show manager, J. Clarke, St. Judes, North Street, Cheddar.

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

16th September: Buxton and District A.S. Third Open Show at the Pavilion Gardens, Buxton. Schedules from the show secretary, A. Holland, 8 Midland Terrace, New Mills, Via Stockport, Cheshire.

16th September: Stone A.S. Open Show. Full details later.

22nd September: Torbay A.S. Open Show, at the Torquay Town Hall. Further details later.

20th September: Northampton and District A.S. Open Show at the Drill Hall, Northampton. Schedules will be available shortly from G. Allatt, 80 Chiltern Avenue, Northampton.

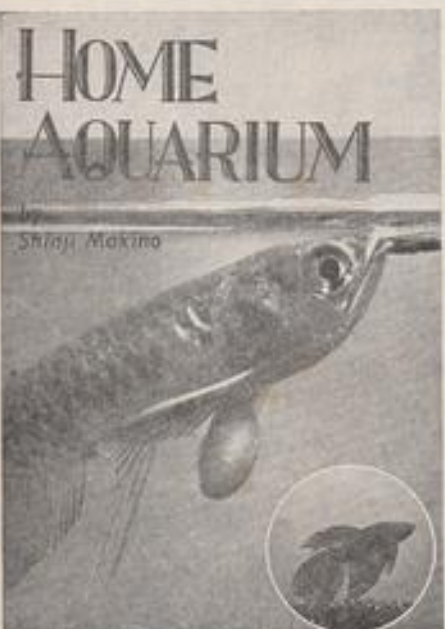
6th October: East London Aquarist & Pondkeepers' Association Annual Open-Breeders' Show. Schedules available from The Show Secretary, F. Vicker, 13 Irons Way, Collier Row, Romford, Essex.

7th October: Eboracum Aquarists First Open Show. Further details available at a later date.

28th October: Newcastle Guppy and Livebearer Society Annual Open Show. Further details later.

3rd November: G.S.G.B. Quarterly Meeting, 2.30 p.m., Conway Hall, Red Lion Square, Holborn, London. Goldfish for Beginners, Part Four, R. Whittington. The Bristol Shubunkin, L. Ilmery. Choosing next year's Breeders. Panel. Table Classes. Refreshments available.

4th November: The Mixenden T.F.S. Open Show.



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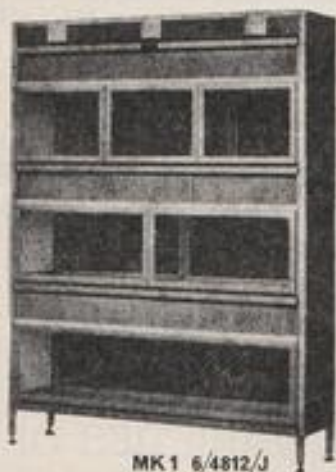
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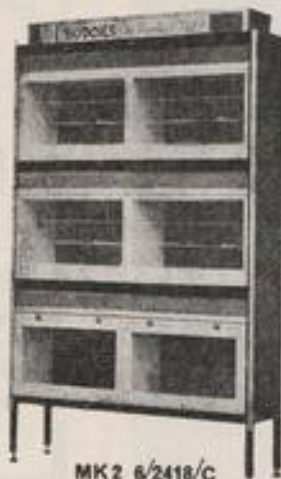
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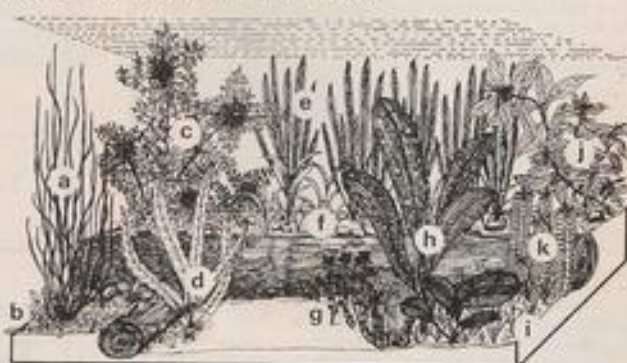
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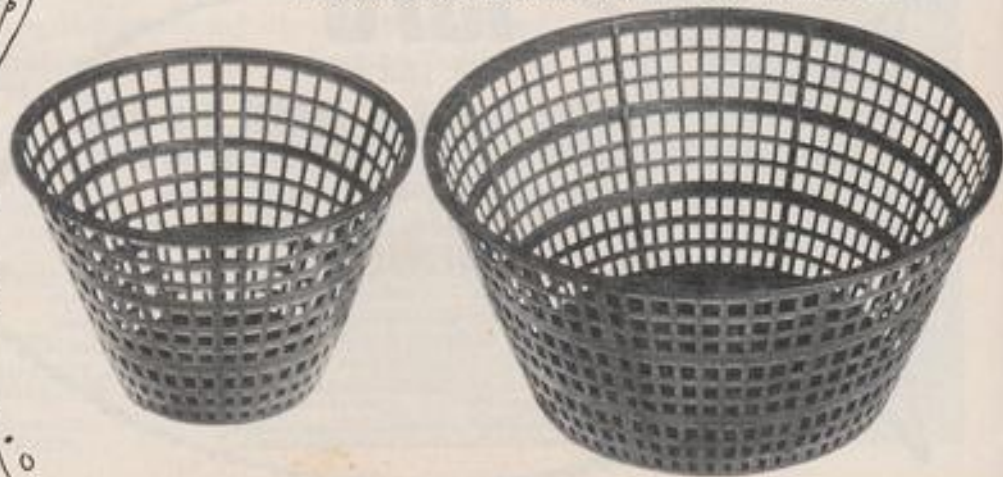
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